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ABSTRACT

During the 1989-90 school year, the Barrett Math Program was piloted in selected sections of grades K-7 in five Atlanta (Georgia) Public Schools (APS) elementary schools. The Barrett Math Program is designed to improve the total mathematical skills of elementary school students, including computation, concepts, and problem solving, as measured by the Iowa Test of Basic Skills (ITBS). At the end of the school year, the Barrett Math students' gain in mean normal curve equivalent (NCE) points was compared with the gain in NCE points for nonprogram students at the Barrett schools (I-controls) and for students selected from five control schools (E-controls). Results indicated that overall the Barrett Math students significantly outgained the I-control students in total mathematics scores and in all of the mathematics subscores of the ITBS. They significantly outgained the E-control students in mathematical problem solving. It was concluded that the Barrett Math method of instruction was effective in improving mathematics achievement. Recommendations for further improving results are presented. An appendix contains 15 program objectives and sequences of mathematics objectives for grades 1-5. (Author/MDH)

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Report of the 1989-90 Barrett Math Program

DEPARTMENT OF RESEARCH AND EVALUATION
ATLANTA PUBLIC SCHOOLS
ATLANTA, GEORGIA 30335

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Report of the 1989-90 Barrett Math Program

Prepared by
Dr. Minnie R. Ruffin, Researcher
Department of Research and Evaluation

Dr. Myrtice Taylor, Assistant Superintendent
Division of Curriculum and Instruction

Dr. Lester W. Butts
Superintendent

Atlanta Public Schools
210 Pryor Street, SW
Atlanta, Georgia 30335

February 1991

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Report of the
1989-90
Barrett Math Program

ABSTRACT

During the 1989-90 school year, the Barrett Math program was piloted in selected sections of grades kindergarten through seven in five Atlanta Public Schools (APS) elementary schools: Campbell, Carter, Hope, Slater, and Pitts. Developed by Professor Everard Barrett, the Barrett Math program is a skills development program designed to improve the total mathematical skills, including computation, concepts and problem solving, of elementary school students.

Teachers of Barrett Math students received initial and follow-up training in the Barrett Math method of instruction. Implementation of instruction was monitored by local school administrators, a staff development coordinator, and by Professor Barrett.

At the end of the school year, the Barrett Math students' gain in mean normal curve equivalent (NCE) points was statistically compared with the gain in NCE points for nonprogram students at the Barrett Math schools (**I-Controls**) and to the gain in NCE points for students selected from five control schools (**E-Control**). Comparisons were made in total mathematics and in three mathematics subtests: computation, concepts, and problem solving.

Results indicated that overall the Barrett Math students outperformed the I-control students in total mathematics and in all of the mathematics subtests. These differences were highly significant. The performance of the Barrett Math students also was significantly greater than the performance of the E-Control students in mathematics problem solving.

A review of individual school performance revealed that there was a wide range of average performance experienced by the five Barrett Math schools. However, the average NCE gains for program students at Campbell Elementary School was greater in total mathematics and in all mathematics subtests than were gains by program students at the other four schools. Questions are raised which may, when answered, help to explain these variations in school performances.

Based on the results of this evaluation, it is concluded that the Barrett Math method of instruction was effective in improving mathematics achievement. Specific issues which should be addressed in order to improve results are presented along with recommendations.

Report of the
1989-90
Barrett Math Program

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REPORT OF THE
1989-90
BARRETT MATH PROGRAM

INTRODUCTION

During the 1989-90 school year, the Barrett Math Program was piloted in five Atlanta Public Schools (APS): Campbell, Carter, Hope, Slater, and Pitts Elementary Schools. The Barrett Math Program, developed by Professor Everard Barrett (Professor B), was designed to improve the mathematics achievement of elementary school students. Specifically, mathematics computational skills are targeted for improvements; however, improvements in mathematics concepts, mathematics problem solving, and total mathematics are indirect effects of the program as well.

According to Professor Barrett, the Barrett Math Program is based on "contextual" learning:

> The Professor B program bases its pedagogical strategies and techniques on the reality that every child was a competent contextual learner before he/she went to school. The proof of this statement is that every child (with the exception of an extremely small number who are in some way brain damaged) taught himself/herself a language at an early age and retained stories after hearing them a few times. It is well known that the predominant cognitive functioning necessary for such accomplishments is the construction of relationships within some context; otherwise referred to as contextual learning.
>
> The strategies and techniques of the Professor B program are designed to consistently present an internal contextual view of mathematics to learners. This view focuses on the internal dynamics of relationships within the subject matter and is at least as important as the view which sees mathematics in its external contextual relationship to the world. It is the predominant means whereby all learners everywhere will acquire competence in mathematics just as it was the means whereby they learned their native language or retained stories. . . .
>
> The Professor B strategies and techniques for the teaching of arithmetic show how, with tremendous gains in efficiency, any arithmetical algorithm can be performed by youngsters in such a manner that they see each step, even each thought, as related to the overall objective of the exercise. Accordingly, it was necessary to make major alterations on arithmetical algorithms in order to accommodate the contextual view so that competent contextual learners could master arithmetic as inevitably as they mastered their native language or the retention of stories (Appendix, pages 16 and 17).

PROGRAM OBJECTIVES

Professor B cites 15 program objectives in which the Barrett Math Program attempts to achieve. (See Appendix pages 18 and 19.) Nine of these objectives (4-12) deal with teacher outcomes, and the other six (1-3 and 13-15) deal mainly with student outcomes -- particularly student achievement outcomes.

Professor Barrett predicts that the student who completes the program will experience:

- an acceleration of mathematics concept acquisition;
- an increase in reasoning and problem-solving skills;
- a significantly increased rapidity in computational competence; and
- a sense of mastery over curriculum content.

The goal of the present evaluation was to determine if the Barrett Math Program was successful in improving the mathematics achievement of program students. Based on the objectives cited, questions for the present evaluation included the following:

Main Question: Did mathematics computation achievement improve for the Barrett Math students?

Additional Questions:

Did total mathematics achievement improve for the Barrett Math Students?

Did mathematics concepts achievement improve for the Barrett Math students?

Did mathematics problem solving achievement improve for the Barrett Math students?

(No attempts were made to evaluate teacher outcomes.)

METHODS

Classes were selected from five elementary schools from which students were selected to serve as the target group. The target schools were Campbell, Carter, Hope, Slater, and Pitts Elementary Schools. On the basis of proximity of location to these schools, five additional elementary schools with similar structures were selected as control schools. Two control groups were used. The first control group consisted of students from grades and sections at the control schools identical to the grades and sections from which students at the target schools were selected. These students were identified as the **external control group (E-controls)**. A second, randomly-selected, **internal control group (I-controls)** consisted of students from the target schools who were in the same grades but in different class sections and were not receiving the Barrett Math method of instruction. Thus, the current evaluation report was based on data from a total of 972 students: 333 Barrett Math students, 338 I-control students and 301 E-control students (Table 1).

Target and control students (internal and external controls) were tested (pretests) for total mathematics, mathematics concepts, mathematics problem solving, and mathematics computation in the spring of 1989. The 1985 edition of the **Iowa Tests of Basic Skills (ITBS)** was the instrument used to measure achievement. Students were administered the next level of ITBS subtests (posttests) during the spring of 1990, and a statistical comparison was made between the mean normal curve equivalent (NCE) achievement gains of the target students and the

Table I

Target and Control Students Included in the Evaluation Report

Schools and Groups	Number of Students by Grade						
	1st	2nd	3rd	4th	5th	7th	All Grades
Campbell	(N)	(N)	(N)	(N)	(N)	(N)	(N)
Barrett	2	21	19	23	36	--	101
I-Control	5	26	38	27	0	--	96
E-Control	2	22	17	16	28	--	85
Carter							
Barrett	1	0	0	24	21	--	46
I-Control	1	16	15	10	6	--	48
E-Control	3	0	0	26	14	--	43
Hope							
Barrett	2	0	13	40	0	--	55
I-Control	1	14	15	7	17	--	54
E-Control	1	0	17	41	0	--	59
Slater							
Barrett	1	20	0	0	15	--	36
I-Control	1	7	13	12	7	--	40
E-Control	0	20	0	0	24	--	44
Pitts							
Barrett	2	18	17	0	18	40	95
I-Control	2	20	23	27	16	6	95
E-Control	0	12	20	0	12	26	70
Totals							
Barrett	8	59	49	87	90	40	333
I-Control	9	81	101	83	58	6	338
E-Control	6	54	54	83	78	26	301

mean gains achieved by each of the control groups using analysis of variances (ANOVAs).

Description of Treatment

Teachers were initially trained in program and teaching strategies by Professor Barrett. At this training, teachers were introduced to the Barrett Math Program. Teacher's manuals, charts, copies of objectives by grade level, and other resource materials were provided. The completion of the first 82 objectives for all grade levels from first through seventh were deemed important to the completion of the Barrett Math Program. The completion of additional objectives was expected at successive grade levels. Thus, the total number of detailed skills objectives which were recommended for first through fifth grades were 82, 86, 90, 93, and 113, respectively. (See Appendix, pages 20-54.)

The initial training was followed by periodic demonstration and followup sessions at the local school sites by Professor Barrett for at least three additional sessions. At these sessions, Professor Barrett modeled the teaching behaviors which were expected of teachers. This modeling consisted of whole class instruction first involving students responding quickly and in unison to repeated questions related to concepts and computation. After all students appeared to be able to respond correctly, questions were asked of individual students who were expected to answer quickly and accurately. If the student failed to respond quickly and accurately, another student was called on. Similar questions were posed repeatedly to students at random until each student appeared to have grasped the focal concept. Students who mastered the mathematics lesson rapidly were called on to act as the teachers and pose questions to fellow students. This strategy was designed to prevent the accelerated students from becoming bored before the slower students were able to master the objectives.

The Barrett Math Program depends heavily on periodic classroom monitoring and supervision of mathematical lessons. (See Appendix, pages 55-57 for a description of monitoring and supervision activities recommended by Professor Barrett.) According to Professor Barrett, each Barrett Math class should be visited from 12 to 18 times during the school year -- ideally, at least once every two weeks. The task may be performed by the principal, the assistant principal, the curriculum specialist, the mathematics coordinator, a mathematics specialist, or a staff developer.

Each monitored visit should begin with a brief entry conference between the monitor and the teacher, followed by the monitor's observation of the teacher's math lesson. The monitor will determine which lesson to observe the teacher teaching and which lesson to demonstrate to the teacher. During the observation of the teacher's lesson, the monitor should use the following 14 questions as guides:

1. Is the teacher making effective eye contact with all members of the class?
2. Are all of the children focusing their attention on the teacher's activity?
3. Are all of the children responding as the teacher requests?
4. When a unison response by the class is requested, is there, in fact, a unison response from the class?
5. Does the teacher generate a strong, confident unison response before requesting responses from individuals?

6. Is the teacher making students respond as quickly as their responses permit (not so quickly as to overwhelm them, nor so slowly as to bore them)?

7. Does the teacher most often challenge the slowest members of the class to respond individually?

8. Does the teacher request four or five responses from each individual?

9. Does the teacher allow any student to give a response for another without the teacher's permission?

10. Does the teacher vary between unison and individual responses sufficiently often?

11. Does the teacher conduct the activities in a "gamely" manner?

12. Does the teacher cut the unison activity at the peak of excitement?

13. Does the teacher often require that children perform recitation and articulation exercises in front of their classmates?

14. Does the teacher often reward faster learners by having them elicit unison and individual responses from the class? (See Appendix, page 57.)

The monitor should then provide a demonstration lesson, while adhering to the above 14 questions as well. Finally, the assessment visit should be concluded with an exit conference.

Feedback should be provided to the teacher during the classroom demonstration and during the exit conference. Also, during the exit conference, a follow-up visit should be planned and the teacher should give a projection as to which lesson he/she will be more likely teaching at that time. Finally, the monitor should recommend corrective measures for objectives not mastered, and should plan to assess these objectives again during future visits.

A major priority of the Barrett Math Program is the achievement of objective mastery by each class member. Focus is placed on maintenance of mastery once mastery has been attained. Thus, a specified amount of drill time (from 10 to 15 minutes per day) was recommended (depending on the grade level and the objectives targeted) for retention of previously mastered objectives.

Recommended time lines and assessment sheets or forms were provided for teachers to use to check off objectives and initial under the check mark when the total class had achieved an objective. (See Appendix, pages 58-69.) The assessment sheets were then placed either on the classroom door or on a wall inside the classroom. These forms were used by classroom monitors when they visited and made their assessments. If an objective had been mastered and retention had been achieved, the monitor placed a check mark and his/her initials below the teacher's check mark and initials. If the assessment revealed that mastery of an objective had not been achieved and/or sustained, the monitor placeed an "x" instead of a check mark and initialed below the teacher's check mark and initials. The monitor would reassess this objective during some future visit.

RESULTS

To determine if the Barrett Math Program had significant effects on mathematics achievement, the mathematics computation, mathematics concepts,

mathematics problem solving, and total mathematics scores of the target students were statistically compared with those of the comparison students using two-way ANOVAs. Results of these analyses are presented in Tables 2-6.

The NCE mean gains in the posttests scores compared to the pretest scores were used in the ANOVAs to compare the achievement of the Barrett Math and control students. Although the Barrett Math Program was implemented in grades K-7 (excluding grade 6), results for kindergarteners and first-year first graders were not included in the statistical analyses. Kindergarteners were not administered the ITBS, and only first grade retainees had both pretest and posttest scores. However, scores for first grade retainees were included in all analyses.

Mathematics Computation

A review of the performance of program students by school revealed a range of average school performance from a zero NCE gain at Pitts Elementary School to a 6.2 gain at Campbell (Table 2). Schools may be ranked according to the average school performance in mathematics computation from highest to lowest as follows: Campbell, Hope, Carter, Slater, and Pitts.

The average school performance of program students at each of the five Barrett Math schools was always greater than the average performance of the nonprogram students (I-controls) at these schools. The Barrett Math students experienced gains at all five schools; whereas, the I-controls only experienced gains at one school--Campbell.

The average NCE gain in mathematics computation for the Barrett Math students at Campbell was statistically greater than the gain experienced by the I-controls ($P \leq .01$). Program students at Hope also significantly outperformed nonprogram students in mathematics computation ($P \leq .05$).

Two schools, Hope and Pitts, achieved greater NCE gains in mathematics computation than the E-controls from similar schools. However, there were no statistical differences in mathematics computational performance between the Barrett Math students and the E-controls.

When data from all five of the Barrett Math schools were combined and analyzed against combined data for randomly selected I-controls (Table 6), results indicated that the Barrett Math students' performance significantly exceeded the performance of the I-controls ($P \leq .01$). On the other hand, the E-controls, who had a higher mean NCE initially, experienced a greater mean NCE gain in mathematics computation achievement than did program students. However, the difference was not statistically significant (Table 6).

Mathematics Concepts

The results for mean gains in mathematics concepts achievement by individual schools are presented in Table 3. Three of the five Barrett Math schools experienced gains in mean NCEs from 0.7 at Carter to 7.6 at Campbell; whereas, two schools (Hope and Pitts) experienced mean NCE losses. Schools may be ranked according to the average school performance from highest to lowest mean gains in mathematics concepts performance, the schools would be listed as follows: Campbell, Slater, Carter, Hope, and Pitts.

Table 2

Mean Gains in Mathematics Computational Achievement By School on the Iowa Tests of Basic Skills

Schools and Groups	N	1989 Score	1990 Score	Mean Gain or Loss
Campbell		(NCE[1])	(NCE)	(NCE)
Barrett	101	52.5	58.7	6.2
I-Control	96	54.7	57.2	2.5 **
E-Control	85	58.1	66.9	8.8 NS
Carter				
Barrett	46	46.0	47.2	1.2
I-Control	48	55.2	53.0	-2.2 NS[2]
E-Control	43	42.4	49.6	7.2 NS
Hope				
Barrett	55	44.1	46.0	1.9
I-Control	54	59.1	52.1	-7.0 *
E-Control	59	55.5	54.9	-0.6 NS
Slater				
Barrett	36	56.8	57.0	0.2
I-Control	40	54.8	54.1	-0.7 NS
E-Control	44	54.8	55.2	0.4 NS
Pitts				
Barrett	95	47.5	47.5	0.0
I-Control	94	51.2	46.1	-5.1 NS
E-Control	70	47.9	47.0	-0.9 NS

[1]NCE = Normal curve equivalent
[2]NS = Not statistically significant when compared to Barrett Math
*Statistically significant ($P \leq .05$) when compared to Barrett Math
**Highly statistically significant ($P \leq .01$) when compared to Barrett Math

Table 3

Mean Gains in Mathematics Concepts Achievement By School
on the Iowa Tests of Basic Skills

Schools and Groups	N	1989	1990	Mean Gain or Loss
Campbell		(NCE[1])	(NCE)	(NCE)
Barrett	101	53.2	60.8	7.6
I-Control	96	54.4	53.8	-0.6**
E-Control	85	60.7	60.0	-0.7**
Carter				
Barrett	46	45.1	45.8	0.7
I-Control	48	53.6	57.7	4.1 NS[2]
E-Control	43	42.8	45.9	3.1 NS
Hope				
Barrett	55	44.1	43.3	-0.8
I-Control	54	56.6	46.8	-9.8 *
E-Control	59	59.5	57.2	-2.3 NS
Slater				
Barrett	36	56.9	61.4	4.5
I-Control	40	54.1	50.9	-3.2 NS
E-Control	44	53.0	56.2	3.2 NS
Pitts				
Barrett	94	44.2	42.0	-2.2 NS
I-Control	94	46.8	44.7	-2.1 NS
E-Control	70	48.4	45.1	-3.3 NS

[1]NCE = normal curve equivalent
[2]NS = Not statistically significant
*Statistically significant ($P \leq .05$)
**Highly statistically significant ($P \leq .01$)

When the Barrett Math students' performance was compared with their internal controls' performance in mathematics concepts, results revealed that program students at all Barrett Math schools except two, Carter and Pitts, outperformed the I- control students. The difference in performance between the Barrett Math students and the I-controls was highly significant at Campbell ($P \leq .01$). Although their was a mean loss in NCE at Hope and its I-controls, the loss for Hope was significantly less than mean NCE loss for the I-controls ($P \leq .05$). There were no statistical differences noted for the other three schools.

The Barrett Math students experienced greater achievement in mathematics concepts than the E-controls in four of the five schools. This difference was highly significant at Campbell, but not at the other three schools. Also, although the performance at Pitts was slightly lower than that for the controls, this difference was not statistically significant.

When the overall performance of the Barrett Math students was compared with the overall performance of the control students, the Barrett math students' performance exceeded both the performance of the I-controls and the E-controls. The difference in performance between the program students and the I-controls was highly significant (Table 6). There were no significant differences between the NCE gains in mathematics concepts achievement of the Barrett math students and the E-controls.

Mathematics Problem Solving

The results for mathematics problem solving achievement are presented in Table 4. Two of the five schools (Campbell and Carter) experienced mean gains in NCE and three schools experienced mean NCE losses. If arranged in order of highest to lowest mean gain in achievement, the schools would be listed in the following order: Campbell, Carter, Hope, Pitts, and Slater.

The statistical analyses of the mean gains in problem solving achievement scores revealed that Barrett Math students at all except one school (Slater) outperformed the I-controls. The difference in performance between the program and nonprogram students was highly significant at Campbell Elementary School, but was not statistically significant at any of the other four schools.

Compared to the E-controls, the Barrett Math students at all except two schools (Carter and Hope) demonstrated a higher performance than the controls. However, only the difference between Campbell's Barrett Math students and the E-controls was statistically significant ($P \leq .01$).

A review of the overall results of problem solving achievement between Barrett Math students and control students indicated that the Barrett Math students outperformed the I-controls and the E-controls. The Barrett Math students experienced an overall mean gain of 2.2 NCEs; whereas, both the I-controls and the E-controls experienced mean losses (-2.0 for the I-controls and -1.7 for the E-controls). These differences were highly significant (Table 6).

Total Mathematics

The results for mean gains in total mathematics achievement for individual schools are presented in Table 5. The mean change in NCE between the pretesting

Table 4

Mean Gains in Mathematics Problem Solving Achievement By School on the Iowa Tests of Basic Skills

Schools	N	1989	1990	Mean Gain or Loss
Campbell		(NCE[1])	(NCE)	(NCE)
Barrett	101	44.9	55.4	10.5
I-Control	96	49.6	50.0	0.4**
E-Control	85	59.1	57.3	-1.8**
Carter				
Barrett	46	37.6	38.2	0.6
I-Control	48	50.7	48.4	-2.3 NS[2]
E-Control	43	40.5	41.5	1.0 NS
Hope				
Barrett	55	38.8	38.2	-0.6
I-Control	54	49.9	45.5	-4.4 NS
E-Control	59	48.7	50.3	1.6 NS
Slater				
Barrett	36	51.2	46.1	-5.1
I-Control	40	47.7	47.0	-0.7 NS
E-Control	44	47.0	40.6	-6.4 NS
Pitts				
Barrett	95	43.0	41.8	-1.2
I-Control	94	43.3	41.0	-2.3 NS
E-Control	70	44.4	41.5	-2.9 NS

[1]NCE = Normal curve equivalent
[2]NS = Not statistically significant when compared to Barrett Math
*Statistically significant ($P \leq .05$) when compared to Barrett Math
**Highly statistically significant ($P \leq .01$) when compared to Barrett Math

Table 5

Mean Gains in Total Mathematics Achievement By School
on the Iowa Tests of Basic Skills

Schools	N	1989 Score	1990 Score	Mean Gain or Loss
Campbell		(NCE[1])	(NCE)	(NCE)
Barrett	101	49.8	59.2	9.4
I-Control	96	52.7	53.5	0.8**
E-Control	85	60.5	62.5	2.0**
Carter				
Barrett	46	41.6	42.3	0.7
I-Control	48	53.2	53.5	0.3 NS[2]
E-Control	43	40.3	44.8	4.5 NS
Hope				
Barrett	54	41.2	41.5	0.3
I-Control	54	55.5	47.4	-8.1*
E-Control	59	55.4	54.4	-1.0 NS
Slater				
Barrett	36	55.6	55.3	-0.3
I-Control	40	52.3	50.3	-2.0 NS
E-Control	44	51.4	50.1	-1.3 NS
Pitts				
Barrett	95	43.9	42.4	-1.5
I-Control	94	46.1	42.6	-3.5 NS
E-Control	70	45.7	43.9	-1.8 NS

[1]NCE = Normal curve equivalent
[2]NS = Not statistically significant when compared to Barrett Math
*Statistically significant ($P \leq .05$) when compared to Barrett Math
**Highly statistically significant ($P \leq .01$) when compared to Barrett Math

Table 6

Summary of Mathematics Performance of Barrett Math Versus Control Students
(Mean Gains in ITBS[1] scores from 1989 to 1990)

Subtest and Groups	N	1989	1990	Mean Gain (Loss)
Math Computation		(NCE)	(NCE)[2]	(NCE)
Barrett	332	49.3	51.7	2.4
I-Control	338	54.6	51.6	-3.0**
E-Control	301	52.5	55.7	3.2 NS[3]
Math Concepts				
Barrett	332	48.4	50.5	2.1
I-Control	337	52.4	49.8	-2.6**
E-Control	301	53.9	53.4	-0.5 NS
Problem Solving				
Barrett	333	43.0	45.3	2.2
I-Control	337	47.6	45.6	- 2.0**
E-Control	301	49.2	47.5	- 1.7*
Total Math				
Barrett	332	46.2	48.8	2.6
I-Control	337	51.3	48.4	- 2.9**
E-Control	301	51.8	52.2	0.4 NS

[1]ITBS = Iowa Tests of Basic Skills
[2]NCE = Normal curve equivalents
[3]NS = Not statistically significant when compared to Barrett Math
*Statistically significant ($P \leq .05$) when compared to Barrett Math
**Highly statistically significant ($P \leq .01$) when compared to Barrett Math

and the posttesting ranged from a loss of 1.5 (Pitts) to a gain of 9.4 (Campbell). If arranged in order of highest to lowest achievement gains, the schools would be listed as follows: Campbell, Carter, Hope, Slater, and Pitts.

The performance of Barrett Math students was greater in all cases than were the performance of the I-control students. The difference was statistically significant at Hope ($P \leq .05$) and highly significant ($P \leq .01$) at Campbell. Compared to the E-controls, only the program students at Campbell had a mean gain in total mathematics achievement which was statistically greater than the mean gain for the controls (9.4 vs 2.0, respectively). This difference was highly significant ($P < .01$).

The overall performance of the Barrett Math students in total mathematics achievement was greater than the overall performance of both the I-controls and the E-controls. The difference was highly significant between the Barrett Math students and the I-controls, but not significant between the Barrett Math students and the E-controls (Table 6).

SUMMARY AND CONCLUSIONS

The current report presents an evaluation of the effect of the Barrett Math Program on student achievement in five APS elementary schools: Campbell, Carter, Hope, Slater, and Pitts. The Barrett Math developer, Professor Everard Barrett cites teacher and student outcomes which may be experienced when the program is fully implemented. However, the current evaluation only deals with the predicted student achievement outcomes.

The main evaluation question which was correlated with the main objective of the Barrett math Program was: **Did mathematics computation achievement improve for the Barrett Math students?** Based on the results of the current evaluation, mathematics computational skills did improve for the program students. The achievement in mathematics computation for the Barrett Math students was statistically greater than the achievement for the I-controls. This difference was highly significant ($p \leq .01$). However, there was no statistical difference between the performance of the Barrett Math students and the performance of the E-controls.

Additional evaluation questions were: **Did total mathematics achievement improve for the Barrett Math students? Did mathematics concepts achievement improve? Did mathematics problem solving achievement improve?** When the performance of the Barrett math students was compared with the performance of the I-controls, their performance in all of these mathematics areas--total mathematics, mathematics concepts, and mathematical problem solving--was statistically greater. In fact, the I-controls demonstrated a mean NCE loss in performance in all of these areas, even though the mean pretest scores were always greater for the I-controls than for the Barrett Math students. The differences between the performance of the Barrett Math students and the I-controls were highly significant in all cases.

When compared with the E-controls, the performance of the Barrett Math students exceeded that of the E-controls in total mathematics, mathematics concepts, and mathematics problem solving. Only the difference in problem solving achievement was statistically significant ($p \leq .05$).

Review of data for individual schools revealed a wide range between schools in mean achievement experienced by the Barrett Math students. In total mathematics and in all three of the mathematics subareas, the Barrett Math students at Campbell demonstrated the greatest increase in achievement. The differences experienced between program students and I-control students at this school was highly significant in all areas, and the differences between program students and E-controls was highly significant in all except one area--mathematics computation. It appears that the high positive gains experienced by the Campbell program students were largely responsible for the high statistical performance which resulted when overall comparisons were made between the Barrett Math students and control students.

Program students at Carter had the second highest achievement in two of the four test areas (total mathematics and problem solving), and program students at Pitts experienced the lowest gains in achievement in three of the four test areas (total mathematics, mathematics computation, and mathematics concepts). Program students at Hope and Slater showed varying degrees of performance on the different test areas.

Why were there wide variations among schools in the achievement of Barrett Math students? Was the program fully implemented at all schools? Were all of the required skills objectives covered? Did program implementation begin at the same point in time at all schools? Was the duration of implementation the same for all schools? Was the program implemented to the same degree at all schools? Were daily Barrett Math lessons and drill sessions provided for students in all classes? Were recommended monitoring procedures followed? Were all teachers provided initial and follow-up training? Was the period of program implementation sufficient and equivalent for all schools?

These are some of the questions which should be answered in order to fully assess the variations in achievement among Barrett Math students at the five schools. Regardless of the individual school performance of program students, overall results indicate that the Barrett Math Program did have positive effects on mathematics achievement. Achievement gains were made for program students in total mathematics, mathematics computation, mathematics concepts, and mathematics problem solving. Therefore, there is evidence to support continuing and expanding the Barrett Math Program to other elementary schools, particularly those schools with large percentages of students who may have mathematics skills deficits.

ISSUES AND RECOMMENDATIONS

Issue #1: There was a wide variation between schools in the mathematics performance of Barrett Math students, even though theoretically, program implementation should have been uniform in all schools.

Recommendation #1: A survey should be conducted in the five Barrett Math schools to determine the following:

- Was the Barrett Math fully implemented at all schools?
- Were all of the required skills objectives covered?
- Did program implementation begin at the same point in time at all schools?
- Was the period of implementation sufficient and equivalent for all schools?
- Were daily Barrett Math lessons and drill sessions provided for students at all classes?
- Were all classes monitored at least once every two weeks?
- Were monitoring procedures followed?
- Did all Barrett Math teachers receive training?
- Was there a correlation between the length of time a school conducted Barrett Math instruction and the performance of students?

Issue #2: The performance of students at one school, Campbell, was greater in all test areas than the performance of students in each of the other four Barrett Math schools and greater than the performance of the control groups.

Recommendation #2: Staff and local school administrators at Campbell should be interviewed to determine if the Barrett Math Program was implemented differently at this school than at the other four schools, or if there were other reasons for the greater achievement realized by Barrett Math students.

Issue #3: Results of the overall data indicated that the Barrett Math Program was successful in improving the Barrett Math student's total mathematics skills including, mathematics computational skills, mathematics concepts, and mathematics problem solving skills, when compared to nonprogram students in the same schools.

Recommendation #3: There is evidence to support the continuation of the Barrett Math Program.

APPENDIX

TEACHING MATHEMATICS THROUGH CONTEXT

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The Professor B program bases its pedagogical strategies and techniques on the reality that every child was a competent contextual learner before he/she went to school. The proof of this statement is that every child (with the exception of an extremely small number who are in some way brain damaged) taught himself/herself a language at an early age and retained stories after hearing them a few times. It is well known that the predominant cognitive functioning necessary for such accomplishments is the construction of relationships within some context; otherwise referred to as contextual learning.

The strategies and techniques of the Professor B program are designed to consistently present an internal contextual view of mathematics to learners. This view focuses on the internal dynamics of relationships within the subject matter and is at least as important as the view which sees mathematics in its external contextual relationship to the world. It is the predominant means whereby all learners everywhere will acquire competence in mathematics just as it was the means whereby they learned their native language or retained stories.

Is it possible for a pupil to exercise his/her capacity as a competent contextual learner when taught long division or transformation of a fraction to a decimal (using division) by means of traditional techniques? The writer recalls that as a youngster he "broke through" in his attempt to master long division soon after it suddenly occurred to him: "It is not possible to understand that stuff." How strange! It was necessary to "abandon reason" as a prerequisite to mastering the skill. It was impossible to see, contextually, how each "step" in the algorithm was related to the objective of the long division exercise. This is similarly true of all arithmetical algorithms as traditionally taught.

The Professor B strategies and techniques for the teaching of arithmetic show how, with tremendous gains in efficiency, any arithmetical algorithm can be performed by youngsters in such a manner that they see each step, even each thought, as related to the overall objective of the exercise. Accordingly, it was necessary to make major alterations on arithmetical algorithms in order to accomodate the contextual view so that competent contextual learners could master arithmetic as inevitably as they mastered their native language or the retention of stories.

Let us take a look at the transformation of five-eighths to a decimal by means of a Professor B algorithm. After placing 5 as the dividend and 8 as the divisor, pupils are made aware that since 8 cannot "go into" 5 once, they must move from the one's place in the quotient over to the tenth's place (in the quotient). However, it is not possible to fill the tenth's place unless we change the dividend to tenths. Hence we must "exchange" fifty tenths (symbolized as 5.0) for five wholes (symbolized as 5). Now we can say, "Eight into 50 tenths are 6 tenths." Having said that, we write ".6" in the quotient (decimal point in the quotient directly above the decimal point in the dividend) and continue, "Eight times six-tenths are forty-eight tenths."

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We now write forty-eight tenths, symbolized as 4.8, below 5.0 (decimal points "lined up") and subtract forty-eight tenths from fifty tenths leaving two tenths symbolized as .2 and written below 4.8 (decimal points lined up). We now have to fill the hundredth's place in the quotient. This cannot be done until we change the new dividend, two-tenths (.2), into hundredths. So we exchange 20 hundredths (.20) for two-tenths (.2). Continuing, we say, "Eight into twenty hundredths are two hundredths," and place the digit 2 in the hundredth's place of the quotient; "Eight times two hundredths are sixteen hundredths," so we write .16 appropriately under .20; and, "Sixteen hundredths from twenty hundredths leaves four hundredths." Four hundredths are written symbolically as .04 under .16. Continuing similarly, we must exchange 40 thousandths (.040) for 4 hundredths (.04) in order to "fill" the thousandth's place in the quotient. Since the new dividend is .040, we say, "Eight into 40 thousandths are 5 thousandths," and write the digit 5 in the thousandth's place of the quotient. Five-eighths are equivalent to .625.

The work looks like this

```
    .625
8)5.0
  4.8
  ---
   .20
   .16
   ---
   .040
   .040
   ----
```

Perform the traditional algorithm in order to find the decimal equivalent to five-eighths. Focus your attention on your own "inner voice" as you "talk" yourself through the exercise. Note that every statement made by your inner voice, and hence by your "outer voice" when you teach this algorithm, is either false or meaningless. There is no view of how each step taken is related to the objective of the exercise.

Consider the enormous amount of "remediation time" saved by the contextual view. Is it not likely that the performance of this algorithm will be mastered more quickly than the traditional exercise for transforming a fraction to a decimal? Will students not feel better because they see how each step is related to the objective of the exercise? Will they not be able to explain it better to their peers? Will they have to abandon reason in order to survive this experience? Will this not facilitate cooperative learning and critical thinking?

PROFESSOR B TURN-KEY STAFF DEVELOPMENT
ACCELERATED LEARNING OF MATHEMATICS BY ALL CHILDREN
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PROGRAM OBJECTIVES

1. To provide accelerated learning in mathematics to all early childhood and upper elementary children.

2. To deter the development of hostile, antisocial behavior in children within the junior high schools due to their discovery of competent and successful intellects.

3. To consistently engage early childhood and upper elementary children in tried and proven "focus and concentration" games which generate "rapid-fire-response" activities which effectively remove symptoms associated with "slow" learners by
   (a) greatly increasing their attention span;
   (b) quickening their responses to classroom stimuli; and
   (c) developing their capacities for the performance of very rapid mental processes.

4. To provide intensive training, complete with classroom demonstration lessons, to regular classroom teachers so they may deliver accelerated learning of arithmetic to all pre-K through 6th grade children.

5. To provide teachers and schools the staff-development materials necessary for an effective implementation of accelerated learning in arithmetic by all children.

6. To provide intensive training to staff-development personnel and math specialists so that they may be prepared to facilitate the implementation.

7. To introduce teachers, staff developers, math specialists and principals to mastery learning strategies and means of mastery-learning assessment which are much quicker than the traditional (paper and pencil) means.

8. To train teachers, staff developers, math specialists and principals in the means of sustaining mastery of past objectives.

9. To prepare staff developers, math specialists and principals for the use of strategies and instruments which ensure
   (a) teachers' daily performance of prescribed lessons and practice routines; and
   (b) that mastery, once attained, continues to be sustained.

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10. To deliver an effective "turn-key" operation by preparing staff developers and math specialists to
    (a) perform the classroom demonstrations in teachers' classrooms when new schools adopt the program;
    (b) monitor/supervise teachers' performance in their classroom delivery of accelerated learning to all children and their practice of the dictum: mastery once attained must be sustained.

11. To provide consultation with math curriculum specialists for the purpose of upgrading grade level requirements in response to the accelerated learning by all children.

12. To continue the training of teachers as more advanced topics continue to be brought down to lower grades.

13. To generate an expansive data base in order to provide a sensitive measure of how well, and why, the program is successful:

    (a) end-of-the-year achievement test results for experimental and control group classrooms; and
    (b) interviews with selected students, administrators, staff developers, math specialists and all teachers participating in the program.

14. To conduct additional research for the purpose of showing
    (a) an acceleration of math concept acquisition;
    (b) an increase in reasoning and problem solving skills across the curriculum;
    (c) an increased capacity for self-monitoring skills which manifests itself in more accurate task performance;
    (d) a significant increase in attention span;
    (e) a significantly increased rapidity in computational competence;
    (f) a significantly increased sense of self-efficacy and self esteem;
    (g) a sense of mastery over curriculum content;
    (h) an increase in socialization skills, group cohesion and verbal interactiveness among students in and out of specific classroom settings;
    (i) an increase in verbal interactiveness between students and the teacher in and out of specific classroom settings;
    (j) teachers' mastery of computational arithmetic; and
    (k) the relation of teachers' self-esteem to their new sense of mastery in arithmetic.

15. To track students in the program over a number of years in anticipation of significantly lower dropout rates.

PROFESSOR B SEQUENCE OF MATH OBJECTIVES
FIRST GRADE

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OBJECTIVE #1 Children will say the complement in ten of any number chosen from one through nine.

OBJECTIVE #2 Children will instantly say the complement in ten of any number chosen from one through nine.

OBJECTIVE #3 Children will respond instantly and correctly when asked questions such as: "Ten-two," "Ten-seven," "Ten-four," "Ten-five," and so on.

OBJECTIVE #4 Children will respond instantly and correctly when the teacher taps such subtraction facts on chart #2 as "10-7," "10-5," "10-1," and so on.

OBJECTIVE #5 Children will say the complement in nine of any number chosen from one through eight.

OBJECTIVE #6 Children will instantly say the complement in nine of any number chosen from one through eight.

OBJECTIVE #7 Children will answer correctly when asked questions such as: "Nine-three," "Nine-five," "Nine-four," "Nine-eight," and so on.

OBJECTIVE #8 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-4," "9-2," "9-6," and so on.

OBJECTIVE #9 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-seven," "Ten-two," "Nine-five," and so on.

OBJECTIVE #10 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-8," "9-2," "10-5," "9-3," and so on.

OBJECTIVE #11 Children will say the complement in eight of any number chosen from one through seven.

OBJECTIVE #12 Children will instantly say the complement in eight of any number chosen from one through seven.

OBJECTIVE #13 Children will answer correctly when asked questions such as: "Eight-three," "Eight-five," "Eight-two," and so on.

OBJECTIVE #14 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "8-4," "8-2," "8-5," and so on.

OBJECTIVE #15 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-five," "Eight-seven," "Ten-nine," "Nine-two," "Eight-six," and so on.

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OBJECTIVE #16 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-6," "9-4," "8-1," "9-7," "8-4," "10-3," and so on.

OBJECTIVE #17 Children will say the complement in seven of any number chosen from one through six.

OBJECTIVE #18 Children will instantly say the complement in seven of any number chosen from one through six.

OBJECTIVE #19 Children will answer correctly when asked questions such as: "Seven-three," "Seven-six," "Seven-one," and so on.

OBJECTIVE #20 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "7-5," "7-3," "7-1," and so on.

OBJECTIVE #21 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-eight," "Eight-five," "Seven-two," "Ten-seven," "Nine-three," "Eight-four," "Seven-two," "Eight-five," "Seven-two," "Ten-five," "Nine-eight," and so on.

OBJECTIVE #22 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-9," "7-4," "9-6," "8-2," "7-1," "10-5," "8-7," "9-5," and so on.

OBJECTIVE #23 Children will say the complement in six of any number chosen from one through five.

OBJECTIVE #24 Children will instantly say the complement in six of any number chosen from one through five.

OBJECTIVE #25 Children will answer correctly when asked questions such as: "Six-four," "Six-one," "Six-three," and so on.

OBJECTIVE #26 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "6-4," "6-1," "6-3," and so on.

OBJECTIVE #27 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-seven," "Nine-five," "Eight-two," "Seven-four," "Six-three," "Eight-seven," "Ten-three," "Seven-two," "Nine-six," "Six-four," and so on.

OBJECTIVE #28 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-5," "10-9," "7-3," "6-2," "8-1," "6-5," "10-4," "8-4," "7-6," "9-3," and so on.

OBJECTIVE #29 Children will say the complement in five of any number chosen from one to four.

OBJECTIVE #30 Children will instantly say the complement in five of any number chosen from one through four.

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OBJECTIVE #31 Children will answer correctly when asked questions such as: "Five-two," "Five-four," "Five-one," and so on.

OBJECTIVE #32 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "5-3," "5-4," "5-2," and so on.

OBJECTIVE #33 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Six-five," "Ten-seven," "Five-two," "Seven-four," "Seven-two," "Nine-four," "Eigth-five," and so on.

OBJECTIVE #34 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-2," "8-3," "9-7," "5-2," "7-4," "6-2," and so on.

OBJECTIVE #35 Children will say the complement in four of any number chosen from one through three.

OBJECTIVE #36 Children will instantly say the complement in four of any number chosen from one through three.

OBJECTIVE #37 Children will answer correctly when asked questions such as: "Four-one," "Four-three" and "Four-two."

OBJECTIVE #38 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "4-3," "4-2," and "4-1."

OBJECTIVE #39 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Six-five," "Nine-six," "Seven-four," "Ten-eight," "Five-three," "Eight-five," "Four-two," and so on.

OBJECTIVE #40 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-8," "10-3," "6-4," "7-5," "8-4," "5-3," "4-2," and so on.

OBJECTIVE #41 Children will instantly say the complement in three of one or two and the complement in two of one.

OBJECTIVE #42 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "3-1," "3-2," "2-1."

OBJECTIVE #43 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Five-four," "Nine-two," "Two-one," "Ten-five," "Four-three," "Eight-six," "Three-one," "Seven-four," "Six-two," and so on.

OBJECTIVE #44 Children will respond instantly and accurately when the teacher taps any subtraction fact on Chart #2.

OBJECTIVE #45 Children will respond immediately and correctly (without use of fingers) to questions on the lower subtraction facts.

OBJECTIVE #46 Given two addends, children will correctly identify which chart contains them.

OBJECTIVE #47 Given two addends, children will immediately and correctly identify (without use of fingers) the chart which contains them.

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OBJECTIVE #48 Children will respond immediately and accurately (without use of fingers) to questions on the lower addition facts.

OBJECTIVE #49 Children will quickly and correctly do mixed written exercises involving addition and subtraction (sum less than or equal to 10).

OBJECTIVE #50 Children will count from 1 to 10 while tapping the associated numerals on CHART #4.

OBJECTIVE #51 Children will count from 1 to 20 while tapping numerals appropriately on Chart #4.

OBJECTIVE #52 Children will be able to count from 1 to 100 while tapping numerals appropriately on CHART #4.

OBJECTIVE #53 Children will be able to count from 1 to 100 while only looking at CHART #4.

OBJECTIVE #54 Children will be able to count from 1 to 100 without looking at CHART #4.

OBJECTIVE #55 Children will respond instantly and correctly to the 10+1 through 10+9 addition facts.

OBJECTIVE #56 Children will transform the "nine-plus," "eight-plus," "seven-plus" and "six-plus" addition facts into equivalent "ten-plus" facts and find the answers without counting.

OBJECTIVE #57 Children will respond immediately and accurately (without use of fingers) to questions on the higher addition facts by means of a cognitive process.

OBJECTIVE #58 Children will respond immediately and accurately to the "ten minus" facts as they are indicated by the pointer on CHART #7.

OBJECTIVE #59 Children will respond immediately and accurately when the teacher points to examples on CHART #7. For example, when the teacher points appropriately to 12-7, children will respond, "Three plus two."

OBJECTIVE #60 Children will give answers to the higher subtraction facts by means of a cognitive process, without the use of fingers.

OBJECTIVE #61 Children will quicken their cognitive responses to questions on the higher subtraction facts.

OBJECTIVE #62 Children will respond immediately and accurately to questions on the higher subtraction facts by means of a cognitive process.

OBJECTIVE #63 Children will be able to

1. respond instantly and correctly when asked any of the "two times" multiplication facts;
2. recite the multiples of 2 forward to 20 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

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OBJECTIVE #64 Children will respond instantly and correctly when the teacher taps any "one times" or "two-times" multiplication fact (first two rows and first two columns) on the Professor B Times Tables Chart.

OBJECTIVE #65 Children will be able to

1. respond instantly and correctly when asked any of the "three times" multiplication facts;
2. recite the multiples of 3 forward to 30 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #66 Children will respond instantly and correctly when the teacher taps any "one times," "two times" or "three times" multiplication fact (first three rows and first three columns) on the Professor B Times Tables Chart.

OBJECTIVE #67 Children will be able to

1. respond instantly and correctly when asked any of the "four times" multiplication facts;
2. recite the multiples of 4 forward to 40 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #68 Children will respond instantly and correctly when the teacher taps any "one times," through "four times" multiplication fact (first four rows and first four columns) on the Professor B Times Tables Chart.

OBJECTIVE #69 Children will be able to

1. respond instantly and correctly when asked any of the "five times" multiplication facts;
2. recite the multiples of 5 forward to 50 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #70 Children will respond instantly and correctly when the teacher taps any "one times," through "five times" multiplication fact (first five rows and first five columns) on the Professor B Times Tables Chart.

OBJECTIVE #71 Children will be able to

1. respond instantly and correctly when asked any of the "six times" multiplication facts;
2. recite the multiples of 6 forward to 60 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #72 Children will respond instantly and correctly when the teacher taps any "one times," through "six times" multiplication fact (first six rows and first six columns) on the Professor B Times Tables Chart.

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OBJECTIVE #73 Children will be able to
1. respond instantly and correctly when asked any of the "seven times" multiplication facts;
2. recite the multiples of 7 forward to 70 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #74 Children will respond instantly and correctly when the teacher taps any "one times," through "seven times" multiplication fact (first seven rows and first seven columns) on the Professor B Times Tables Chart.

OBJECTIVE #75 Children will be able to
1. respond instantly and correctly when asked any of the "eight times" multiplication facts;
2. recite the multiples of 8 forward to 80 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #76 Children will respond instantly and correctly when the teacher taps any "one times," through "eight times" multiplication fact (first eight rows and first eight columns) on the Professor B Times Tables Chart.

OBJECTIVE #77 Children will be able to
1. respond instantly and correctly when asked any of the "nine times" multiplication facts;
2. recite the multiples of 9 forward to 90 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #78 Children will respond instantly and correctly when the teacher taps any "one times," through "nine times" multiplication fact (first nine rows and first nine columns) on the Professor B Times Tables Chart.

OBJECTIVE #79 Children will be able to
1. respond instantly and correctly when asked any of the "ten times" multiplication facts;
2. recite the multiples of 10 forward to 100 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #80 Children will respond instantly and correctly when the teacher taps any "one times," through "ten times" multiplication fact (first ten rows and first ten columns) on the Professor B Times Tables Chart.

OBJECTIVE #81 Children will correctly read numerals up to the hundreds of trillions.

OBJECTIVE #82 Children will be able to tell the value of each digit within any number up to the trillions.

PROFESSOR B SEQUENCE OF MATH OBJECTIVES

SECOND GRADE

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OBJECTIVE #1 Children will say the complement in ten of any number chosen from one through nine.

OBJECTIVE #2 Children will instantly say the complement in ten of any number chosen from one through nine.

OBJECTIVE #3 Children will respond instantly and correctly when asked questions such as: "Ten-two," "Ten-seven," "Ten-four," "Ten-five," and so on.

OBJECTIVE #4 Children will respond instantly and correctly when the teacher taps such subtraction facts on chart #2 as "10-7," "10-5," "10-1," and so on.

OBJECTIVE #5 Children will say the complement in nine of any number chosen from one through eight.

OBJECTIVE #6 Children will instantly say the complement in nine of any number chosen from one through eight.

OBJECTIVE #7 Children will answer correctly when asked questions such as: "Nine-three," "Nine-five," "Nine-four," "Nine-eight," and so on.

OBJECTIVE #8 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-4," "9-2," "9-6," and so on.

OBJECTIVE #9 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-seven," "Ten-two," "Nine-five," and so on.

OBJECTIVE #10 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-8," "9-2," "10-5," "9-3," and so on.

OBJECTIVE #11 Children will say the complement in eight of any number chosen from one through seven.

OBJECTIVE #12 Children will instantly say the complement in eight of any number chosen from one through seven.

OBJECTIVE #13 Children will answer correctly when asked questions such as: "Eight-three," "Eight-five," "Eight-two," and so on.

OBJECTIVE #14 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "8-4," "8-2," "8-5," and so on.

OBJECTIVE #15 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-five," "Eight-seven," "Ten-nine," "Nine-two," "Eight-six," and so on.

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OBJECTIVE #16 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-6," "9-4," "8-1," "9-7," "8-4," "10-3," and so on.

OBJECTIVE #17 Children will say the complement in seven of any number chosen from one through six.

OBJECTIVE #18 Children will instantly say the complement in seven of any number chosen from one through six.

OBJECTIVE #19 Children will answer correctly when asked questions such as: "Seven-three," "Seven-six," "Seven-one," and so on.

OBJECTIVE #20 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "7-5," "7-3," "7-1," and so on.

OBJECTIVE #21 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-eight," "Eight-five," "Seven-two," "Ten-seven," "Nine-three," "Eight-four," "Seven-two," "Eight-five," "Seven-two," "Ten-five," "Nine-eight," and so on.

OBJECTIVE #22 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-9," "7-4," "9-6," "8-2," "7-1," "10-5," "8-7," "9-5," and so on.

OBJECTIVE #23 Children will say the complement in six of any number chosen from one through five.

OBJECTIVE #24 Children will instantly say the complement in six of any number chosen from one through five.

OBJECTIVE #25 Children will answer correctly when asked questions such as: "Six-four," "Six-one," "Six-three," and so on.

OBJECTIVE #26 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "6-4," "6-1," "6-3," and so on.

OBJECTIVE #27 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-seven," "Nine-five," "Eight-two," "Seven-four," "Six-three," "Eight-seven," "Ten-three," "Seven-two," "Nine-six," "Six-four," and so on.

OBJECTIVE #28 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-5," "10-9," "7-3," "6-2," "8-1," "6-5," "10-4," "8-4," "7-6," "9-3," and so on.

OBJECTIVE #29 Children will say the complement in five of any number chosen from one to four.

OBJECTIVE #30 Children will instantly say the complement in five of any number chosen from one through four.

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OBJECTIVE #31 Children will answer correctly when asked questions such as: "Five-two," "Five-four," "Five-one," and so on.

OBJECTIVE #32 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "5-3," "5-4," "5-2," and so on.

OBJECTIVE #33 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Six-five," "Ten-seven," "Five-two," "Seven-four," "Seven-two," "Nine-four," "Eigth-five," and so on.

OBJECTIVE #34 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-2," "8-3," "9-7," "5-2," "7-4," "6-2," and so on.

OBJECTIVE #35 Children will say the complement in four of any number chosen from one through three.

OBJECTIVE #36 Children will instantly say the complement in four of any number chosen from one through three.

OBJECTIVE #37 Children will answer correctly when asked questions such as: "Four-one," "Four-three" and "Four-two."

OBJECTIVE #38 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "4-3," "4-2," and "4-1."

OBJECTIVE #39 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Six-five," "Nine-six," "Seven-four," "Ten-eight," "Five-three," "Eight-five," "Four-two," and so on.

OBJECTIVE #40 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-8," "10-3," "6-4," "7-5," "8-4," "5-3," "4-2," and so on.

OBJECTIVE #41 Children will instantly say the complement in three of one or two and the complement in two of one.

OBJECTIVE #42 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "3-1," "3-2," "2-1."

OBJECTIVE #43 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Five-four," "Nine-two," "Two-one," "Ten-five," "Four-three," "Eight-six," "Three-one," "Seven-four," "Six-two," and so on.

OBJECTIVE #44 Children will respond instantly and accurately when the teacher taps any subtraction fact on Chart #2.

OBJECTIVE #45 Children will respond immediately and correctly (without use of fingers) to questions on the lower subtraction facts.

OBJECTIVE #46 Given two addends, children will correctly identify which chart contains them.

OBJECTIVE #47 Given two addends, children will immediately and correctly identify (without use of fingers) the chart which contains them.

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OBJECTIVE #48 Children will respond immediately and accurately (without use of fingers) to questions on the lower addition facts.

OBJECTIVE #49 Children will quickly and correctly do mixed written exercises involving addition and subtraction (sum less than or equal to 10).

OBJECTIVE #50 Children will count from 1 to 10 while tapping the associated numerals on CHART #4.

OBJECTIVE #51 Children will count from 1 to 20 while tapping numerals appropriately on Chart #4.

OBJECTIVE #52 Children will be able to count from 1 to 100 while tapping numerals appropriately on CHART #4.

OBJECTIVE #53 Children will be able to count from 1 to 100 while only looking at CHART #4.

OBJECTIVE #54 Children will be able to count from 1 to 100 without looking at CHART #4.

OBJECTIVE #55 Children will respond instantly and correctly to the 10+1 through 10+9 addition facts.

OBJECTIVE #56 Children will transform the "nine-plus," "eight-plus," "seven-plus" and "six-plus" addition facts into equivalent "ten-plus" facts and find the answers without counting.

OBJECTIVE #57 Children will respond immediately and accurately (without use of fingers) to questions on the higher addition facts by means of a cognitive process.

OBJECTIVE #58 Children will respond immediately and accurately to the "ten minus" facts as they are indicated by the pointer on CHART #7.

OBJECTIVE #59 Children will respond immediately and accurately when the teacher points to examples on CHART #7. For example, when the teacher points appropriately to 12-7, children will respond, "Three plus two."

OBJECTIVE #60 Children will give answers to the higher subtraction facts by means of a cognitive process, without the use of fingers.

OBJECTIVE #61 Children will quicken their cognitive responses to questions on the higher subtraction facts.

OBJECTIVE #62 Children will respond immediately and accurately to questions on the higher subtraction facts by means of a cognitive process.

OBJECTIVE #63 Children will be able to

1. respond instantly and correctly when asked any of the "two times" multiplication facts;
2. recite the multiples of 2 forward to 20 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

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OBJECTIVE #64 Children will respond instantly and correctly when the teacher taps any "one times" or "two-times" multiplication fact (first two rows and first two columns) on the Professor B Times Tables Chart.

OBJECTIVE #65 Children will be able to

1. respond instantly and correctly when asked any of the "three times" multiplication facts;
2. recite the multiples of 3 forward to 30 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #66 Children will respond instantly and correctly when the teacher taps any "one times," "two times" or "three times" multiplication fact (first three rows and first three columns) on the Professor B Times Tables Chart.

OBJECTIVE #67 Children will be able to

1. respond instantly and correctly when asked any of the "four times" multiplication facts;
2. recite the multiples of 4 forward to 40 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #68 Children will respond instantly and correctly when the teacher taps any "one times," through "four times" multiplication fact (first four rows and first four columns) on the Professor B Times Tables Chart.

OBJECTIVE #69 Children will be able to

1. respond instantly and correctly when asked any of the "five times" multiplication facts;
2. recite the multiples of 5 forward to 50 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #70 Children will respond instantly and correctly when the teacher taps any "one times," through "five times" multiplication fact (first five rows and first five columns) on the Professor B Times Tables Chart.

OBJECTIVE #71 Children will be able to

1. respond instantly and correctly when asked any of the "six times" multiplication facts;
2. recite the multiples of 6 forward to 60 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #72 Children will respond instantly and correctly when the teacher taps any "one times," through "six times" multiplication fact (first six rows and first six columns) on the Professor B Times Tables Chart.

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OBJECTIVE #73 Children will be able to
1. respond instantly and correctly when asked any of the "seven times" multiplication facts;
2. recite the multiples of 7 forward to 70 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #74 Children will respond instantly and correctly when the teacher taps any "one times," through "seven times" multiplication fact (first seven rows and first seven columns) on the Professor B Times Tables Chart.

OBJECTIVE #75 Children will be able to
1. respond instantly and correctly when asked any of the "eight times" multiplication facts;
2. recite the multiples of 8 forward to 80 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #76 Children will respond instantly and correctly when the teacher taps any "one times," through "eight times" multiplication fact (first eight rows and first eight columns) on the Professor B Times Tables Chart.

OBJECTIVE #77 Children will be able to
1. respond instantly and correctly when asked any of the "nine times" multiplication facts;
2. recite the multiples of 9 forward to 90 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #78 Children will respond instantly and correctly when the teacher taps any "one times," through "nine times" multiplication fact (first nine rows and first nine columns) on the Professor B Times Tables Chart.

OBJECTIVE #79 Children will be able to
1. respond instantly and correctly when asked any of the "ten times" multiplication facts;
2. recite the multiples of 10 forward to 100 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #80 Children will respond instantly and correctly when the teacher taps any "one times," through "ten times" multiplication fact (first ten rows and first ten columns) on the Professor B Times Tables Chart.

OBJECTIVE #81 Children will correctly read numerals up to the hundreds of trillions.

OBJECTIVE #82 Children will be able to tell the value of each digit within any number up to the trillions.

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OBJECTIVE #83 Children will quickly and correctly do mixed written exercises involving addition and subtraction (sum less than or eual to 19).

OBJECTIVE #84 Children will correctly do short division, with and without remaider, using the multiplication facts.

OBJECTIVE #85 Children will correctly do additions, with and without regrouping, involving up to two three-place numbers.

OBJECTIVE #86 Children will correctly do subtractions, with and without regrouping, involving up to two three-place numbers.

PROFESSOR B SEQUENCE OF MATH OBJECTIVES
THIRD GRADE

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OBJECTIVE #1 Children will say the complement in ten of any number chosen from one through nine.

OBJECTIVE #2 Children will instantly say the complement in ten of any number chosen from one through nine.

OBJECTIVE #3 Children will respond instantly and correctly when asked questions such as: "Ten-two," "Ten-seven," "Ten-four," "Ten-five," and so on.

OBJECTIVE #4 Children will respond instantly and correctly when the teacher taps such subtraction facts on chart #2 as "10-7," "10-5," "10-1," and so on.

OBJECTIVE #5 Children will say the complement in nine of any number chosen from one through eight.

OBJECTIVE #6 Children will instantly say the complement in nine of any number chosen from one through eight.

OBJECTIVE #7 Children will answer correctly when asked questions such as: "Nine-three," "Nine-five," "Nine-four," "Nine-eight," and so on.

OBJECTIVE #8 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-4," "9-2," "9-6," and so on.

OBJECTIVE #9 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-seven," "Ten-two," "Nine-five," and so on.

OBJECTIVE #10 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-8," "9-2," "10-5," "9-3," and so on.

OBJECTIVE #11 Children will say the complement in eight of any number chosen from one through seven.

OBJECTIVE #12 Children will instantly say the complement in eight of any number chosen from one through seven.

OBJECTIVE #13 Children will answer correctly when asked questions such as: "Eight-three," "Eight-five," "Eight-two," and so on.

OBJECTIVE #14 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "8-4," "8-2," "8-3," and so on.

OBJECTIVE #15 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-five," "Eight-seven," "Ten-nine," "Nine-two," "Eight-six," and so on.

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OBJECTIVE #16 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-5," "9-4," "9-1," "9-7," "8-4," "10-3," and so on.

OBJECTIVE #17 Children will say the complement in seven of any number chosen from one through six.

OBJECTIVE #18 Children will instantly say the complement in seven of any number chosen from one through six.

OBJECTIVE #19 Children will answer correctly when asked questions such as: "Seven-three," "Seven-six," "Seven-one," and so on.

OBJECTIVE #20 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "7-5," "7-3," "7-1," and so on.

OBJECTIVE #21 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-eight," "Eight-five," "Seven-two," "Ten-seven," "Nine-three," "Eight-four," "Seven-two," "Eight-five," "Seven-two," "Ten-five," "Nine-eight," and so on.

OBJECTIVE #22 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-9," "7-4," "9-6," "8-2," "7-1," "10-5," "8-7," "9-5," and so on.

OBJECTIVE #23 Children will say the complement in six of any number chosen from one through five.

OBJECTIVE #24 Children will instantly say the complement in six of any number chosen from one through five.

OBJECTIVE #25 Children will answer correctly when asked questions such as: "Six-four," "Six-one," "Six-three," and so on.

OBJECTIVE #26 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "6-4," "6-1," "6-3," and so on.

OBJECTIVE #27 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-seven," "Nine-five," "Eight-two," "Seven-four," "Six-three," "Eight-seven," "Ten-three," "Seven-two," "Nine-six," "Six-four," and so on.

OBJECTIVE #28 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-5," "10-9," "7-3," "6-2," "8-1," "6-5," "10-4," "8-4," "7-6," "9-3," and so on.

OBJECTIVE #29 Children will say the complement in five of any number chosen from one to four.

OBJECTIVE #30 Children will instantly say the complement in five of any number chosen from one through four.

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OBJECTIVE #31 Children will answer correctly when asked questions such as: "Five-two," "Five-four," "Five-one," and so on.

OBJECTIVE #32 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "5-3," "5-4," "5-2," and so on.

OBJECTIVE #33 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Six-five," "Ten-seven," "Five-two," "Seven-four," "Seven-two," "Nine-four," "Eigth-five," and so on.

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OBJECTIVE #35 Children will say the complement in four of any number chosen from one through three.

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OBJECTIVE #38 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "4-3," "4-2," and "4-1."

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OBJECTIVE #41 Children will instantly say the complement in three of one or two and the complement in two of one.

OBJECTIVE #42 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "3-1," "3-2," "2-1."

OBJECTIVE #43 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Five-four," "Nine-two," "Two-one," "Ten-five," "Four-three," "Eight-six," "Three-one," "Seven-four," "Six-two," and so on.

OBJECTIVE #44 Children will respond instantly and accurately when the teacher taps any subtraction fact on Chart #2.

OBJECTIVE #45 Children will respond immediately and correctly (without use of fingers) to questions on the lower subtraction facts.

OBJECTIVE #46 Given two addends, children will correctly identify which chart contains them.

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OBJECTIVE #51 Children will count from 1 to 20 while tapping numerals appropriately on Chart #4.

OBJECTIVE #52 Children will be able to count from 1 to 100 while tapping numerals appropriately on CHART #4.

OBJECTIVE #53 Children will be able to count from 1 to 100 while only looking at CHART #4.

OBJECTIVE #54 Children will be able to count from 1 to 100 without looking at CHART #4.

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OBJECTIVE #58 Children will respond immediately and accurately to the "ten minus" facts as they are indicated by the pointer on CHART #7.

OBJECTIVE #59 Children will respond immediately and accurately when the teacher points to examples on CHART #7. For example, when the teacher points appropriately to 12-7, children will respond, "Three plus two."

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OBJECTIVE #62 Children will respond immediately and accurately to questions on the higher subtraction facts by means of a cognitive process.

OBJECTIVE #63 Children will be able to

1. respond instantly and correctly when asked any of the "two times" multiplication facts;
2. recite the multiples of 2 forward to 20 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

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OBJECTIVE #64 Children will respond instantly and correctly when the teacher taps any "one times" or "two-times" multiplication fact (first two rows and first two columns) on the Professor B Times Tables Chart.

OBJECTIVE #65 Children will be able to

1. respond instantly and correctly when asked any of the "three times" multiplication facts;
2. recite the multiples of 3 forward to 30 and backward to zero; and
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OBJECTIVE #66 Children will respond instantly and correctly when the teacher taps any "one times," "two times" or "three times" multiplication fact (first three rows and first three columns) on the Professor B Times Tables Chart.

OBJECTIVE #67 Children will be able to

1. respond instantly and correctly when asked any of the "four times" multiplication facts;
2. recite the multiples of 4 forward to 40 and backward to zero; and
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OBJECTIVE #68 Children will respond instantly and correctly when the teacher taps any "one times," through "four times" multiplication fact (first four rows and first four columns) on the Professor B Times Tables Chart.

OBJECTIVE #69 Children will be able to

1. respond instantly and correctly when asked any of the "five times" multiplication facts;
2. recite the multiples of 5 forward to 50 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #70 Children will respond instantly and correctly when the teacher taps any "one times," through "five times" multiplication fact (first five rows and first five columns) on the Professor B Times Tables Chart.

OBJECTIVE #71 Children will be able to

1. respond instantly and correctly when asked any of the "six times" multiplication facts;
2. recite the multiples of 6 forward to 60 and backward to zero; and
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OBJECTIVE #72 Children will respond instantly and correctly when the teacher taps any "one times," through "six times" multiplication fact (first six rows and first six columns) on the Professor B Times Tables Chart.

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OBJECTIVE #74 Children will respond instantly and correctly when the teacher taps any "one times," through "seven times" multiplication fact (first seven rows and first seven columns) on the Professor B Times Tables Chart.

OBJECTIVE #75 Children will be able to
1. respond instantly and correctly when asked any of the "eight times" multiplication facts;
2. recite the multiples of 8 forward to 80 and backward to zero; and
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OBJECTIVE #76 Children will respond instantly and correctly when the teacher taps any "one times," through "eight times" multiplication fact (first eight rows and first eight columns) on the Professor B Times Tables Chart.

OBJECTIVE #77 Children will be able to
1. respond instantly and correctly when asked any of the "nine times" multiplication facts;
2. recite the multiples of 9 forward to 90 and backward to zero; and
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OBJECTIVE #78 Children will respond instantly and correctly when the teacher taps any "one times," through "nine times" multiplication fact (first nine rows and first nine columns) on the Professor B Times Tables Chart.

OBJECTIVE #79 Children will be able to
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OBJECTIVE #80 Children will respond instantly and correctly when the teacher taps any "one times," through "ten times" multiplication fact (first ten rows and first ten columns) on the Professor B Times Tables Chart.

OBJECTIVE #81 Children will correctly read numerals up to the hundreds of trillions.

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OBJECTIVE #83 Children will quickly and correctly do mixed written exercises involving addition and subtraction (sum less than or eual to 19).

OBJECTIVE #84 Children will correctly do short division, with and without remaider, using the multiplication facts.

OBJECTIVE #85 Children will correctly do additions, with and without regrouping, involving up to two three-place numbers.

OBJECTIVE #86 Children will correctly do subtractions, with and without regrouping, involving up to two three-place numbers.

OBJECTIVE #87 Students will correctly do multiplication involving up to three-place numbers by two-place numbers.

OBJECTIVE #88 Students will correctly add and subtract proper fractions involving unlike denominators.

OBJECTIVE #89 Students will correctly transform improper fractions to mixed numbers.

OBJECTIVE #90 Students will correctly transform mixed numbers to improper fractions.

PROFESSOR B SEQUENCE OF MATH OBJECTIVES
FOURTH GRADE

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OBJECTIVE #1 Children will say the complement in ten of any number chosen from one through nine.

OBJECTIVE #2 Children will instantly say the complement in ten of any number chosen from one through nine.

OBJECTIVE #3 Children will respond instantly and correctly when asked questions such as: "Ten-two," "Ten-seven," "Ten-four," "Ten-five," and so on.

OBJECTIVE #4 Children will respond instantly and correctly when the teacher taps such subtraction facts on chart #2 as "10-7," "10-5," "10-1," and so on.

OBJECTIVE #5 Children will say the complement in nine of any number chosen from one through eight.

OBJECTIVE #6 Children will instantly say the complement in nine of any number chosen from one through eight.

OBJECTIVE #7 Children will answer correctly when asked questions such as: "Nine-three," "Nine-five," "Nine-four," "Nine-eight," and so on.

OBJECTIVE #8 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-4," "9-2," "9-6," and so on.

OBJECTIVE #9 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-seven," "Ten-two," "Nine-five," and so on.

OBJECTIVE #10 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-8," "9-2," "10-5," "9-3," and so on.

OBJECTIVE #11 Children will say the complement in eight of any number chosen from one through seven.

OBJECTIVE #12 Children will instantly say the complement in eight of any number chosen from one through seven.

OBJECTIVE #13 Children will answer correctly when asked questions such as: "Eight-three," "Eight-five," "Eight-two," and so on.

OBJECTIVE #14 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "8-4," "8-2," "8-5," and so on.

OBJECTIVE #15 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-five," "Eight-seven," "Ten-nine," "Nine-two," "Eight-six," and so on.

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OBJECTIVE #16 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-6," "9-4," "8-1," "9-7," "8-4," "10-3," and so on.

OBJECTIVE #17 Children will say the complement in seven of any number chosen from one through six.

OBJECTIVE #18 Children will instantly say the complement in seven of any number chosen from one through six.

OBJECTIVE #19 Children will answer correctly when asked questions such as: "Seven-three," "Seven-six," "Seven-one," and so on.

OBJECTIVE #20 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "7-5," "7-3," "7-1," and so on.

OBJECTIVE #21 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-eight," "Eight-five," "Seven-two," "Ten-seven," "Nine-three," "Eight-four," "Seven-two," "Eight-five," "Seven-two," "Ten-five," "Nine-eight," and so on.

OBJECTIVE #22 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-9," "7-4," "9-6," "8-2," "7-1," "10-5," "8-7," "9-5," and so on.

OBJECTIVE #23 Children will say the complement in six of any number chosen from one through five.

OBJECTIVE #24 Children will instantly say the complement in six of any number chosen from one through five.

OBJECTIVE #25 Children will answer correctly when asked questions such as: "Six-four," "Six-one," "Six-three," and so on.

OBJECTIVE #26 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "6-4," "6-1," "6-3," and so on.

OBJECTIVE #27 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-seven," "Nine-five," "Eight-two," "Seven-four," "Six-three," "Eight-seven," "Ten-three," "Seven-two," "Nine-six," "Six-four," and so on.

OBJECTIVE #28 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-5," "10-9," "7-3," "6-2," "8-1," "6-5," "10-4," "8-4," "7-6," "9-3," and so on.

OBJECTIVE #29 Children will say the complement in five of any number chosen from one to four.

OBJECTIVE #30 Children will instantly say the complement in five of any number chosen from one through four.

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OBJECTIVE #31 Children will answer correctly when asked questions such as: "Five-two," "Five-four," "Five-one," and so on.

OBJECTIVE #32 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "5-3," "5-4," "5-2," and so on.

OBJECTIVE #33 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Six-five," "Ten-seven," "Five-two," "Seven-four," "Seven-two," "Nine-four," "Eigth-five," and so on.

OBJECTIVE #34 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-2," "8-3," "9-7," "5-2," "7-4," "6-2," and so on.

OBJECTIVE #35 Children will say the complement in four of any number chosen from one through three.

OBJECTIVE #36 Children will instantly say the complement in four of any number chosen from one through three.

OBJECTIVE #37 Children will answer correctly when asked questions such as: "Four-one," "Four-three" and "Four-two."

OBJECTIVE #38 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "4-3," "4-2," and "4-1."

OBJECTIVE #39 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Six-five," "Nine-six," "Seven-four," "Ten-eight," "Five-three," "Eight-five," "Four-two," and so on.

OBJECTIVE #40 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-8," "10-3," "6-4," "7-5," "8-4," "5-3," "4-2," and so on.

OBJECTIVE #41 Children will instantly say the complement in three of one or two and the complement in two of one.

OBJECTIVE #42 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "3-1," "3-2," "2-1."

OBJECTIVE #43 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Five-four," "Nine-two," "Two-one," "Ten-five," "Four-three," "Eight-six," "Three-one," "Seven-four," "Six-two," and so on.

OBJECTIVE #44 Children will respond instantly and accurately when the teacher taps any subtraction fact on Chart #2.

OBJECTIVE #45 Children will respond immediately and correctly (without use of fingers) to questions on the lower subtraction facts.

OBJECTIVE #46 Given two addends, children will correctly identify which chart contains them.

OBJECTIVE #47 Given two addends, children will immediately and correctly identify (without use of fingers) the chart which contains them.

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OBJECTIVE #48 Children will respond immediately and accurately (without use of fingers) to questions on the lower addition facts.

OBJECTIVE #49 Children will quickly and correctly do mixed written exercises involving addition and subtraction (sum less than or equal to 10).

OBJECTIVE #50 Children will count from 1 to 10 while tapping the associated numerals on CHART #4.

OBJECTIVE #51 Children will count from 1 to 20 while tapping numerals appropriately on Chart #4.

OBJECTIVE #52 Children will be able to count from 1 to 100 while tapping numerals appropriately on CHART #4.

OBJECTIVE #53 Children will be able to count from 1 to 100 while only looking at CHART #4.

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OBJECTIVE #57 Children will respond immediately and accurately (without use of fingers) to questions on the higher addition facts by means of a cognitive process.

OBJECTIVE #58 Children will respond immediately and accurately to the "ten minus" facts as they are indicated by the pointer on CHART #7.

OBJECTIVE #59 Children will respond immediately and accurately when the teacher points to examples on CHART #7. For example, when the teacher points appropriately to 12-7, children will respond, "Three plus two."

OBJECTIVE #60 Children will give answers to the higher subtraction facts by means of a cognitive process, without the use of fingers.

OBJECTIVE #61 Children will quicken their cognitive responses to questions on the higher subtraction facts.

OBJECTIVE #62 Children will respond immediately and accurately to questions on the higher subtraction facts by means of a cognitive process.

OBJECTIVE #63 Children will be able to

1. respond instantly and correctly when asked any of the "two times" multiplication facts;
2. recite the multiples of 2 forward to 20 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

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OBJECTIVE #64 Children will respond instantly and correctly when the teacher taps any "one times" or "two-times" multiplication fact (first two rows and first two columns) on the Professor B Times Tables Chart.

OBJECTIVE #65 Children will be able to

1. respond instantly and correctly when asked any of the "three times" multiplication facts;
2. recite the multiples of 3 forward to 30 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #66 Children will respond instantly and correctly when the teacher taps any "one times," "two times" or "three times" multiplication fact (first three rows and first three columns) on the Professor B Times Tables Chart.

OBJECTIVE #67 Children will be able to

1. respond instantly and correctly when asked any of the "four times" multiplication facts;
2. recite the multiples of 4 forward to 40 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #68 Children will respond instantly and correctly when the teacher taps any "one times," through "four times" multiplication fact (first four rows and first four columns) on the Professor B Times Tables Chart.

OBJECTIVE #69 Children will be able to

1. respond instantly and correctly when asked any of the "five times" multiplication facts;
2. recite the multiples of 5 forward to 50 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #70 Children will respond instantly and correctly when the teacher taps any "one times," through "five times" multiplication fact (first five rows and first five columns) on the Professor B Times Tables Chart.

OBJECTIVE #71 Children will be able to

1. respond instantly and correctly when asked any of the "six times" multiplication facts;
2. recite the multiples of 6 forward to 60 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #72 Children will respond instantly and correctly when the teacher taps any "one times," through "six times" multiplication fact (first six rows and first six columns) on the Professor B Times Tables Chart.

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OBJECTIVE #73 Children will be able to
1. respond instantly and correctly when asked any of the "seven times" multiplication facts;
2. recite the multiples of 7 forward to 70 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #74 Children will respond instantly and correctly when the teacher taps any "one times," through "seven times" multiplication fact (first seven rows and first seven columns) on the Professor B Times Tables Chart.

OBJECTIVE #75 Children will be able to
1. respond instantly and correctly when asked any of the "eight times" multiplication facts;
2. recite the multiples of 8 forward to 80 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #76 Children will respond instantly and correctly when the teacher taps any "one times," through "eight times" multiplication fact (first eight rows and first eight columns) on the Professor B Times Tables Chart.

OBJECTIVE #77 Children will be able to
1. respond instantly and correctly when asked any of the "nine times" multiplication facts;
2. recite the multiples of 9 forward to 90 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #78 Children will respond instantly and correctly when the teacher taps any "one times," through "nine times" multiplication fact (first nine rows and first nine columns) on the Professor B Times Tables Chart.

OBJECTIVE #79 Children will be able to
1. respond instantly and correctly when asked any of the "ten times" multiplication facts;
2. recite the multiples of 10 forward to 100 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

OBJECTIVE #80 Children will respond instantly and correctly when the teacher taps any "one times," through "ten times" multiplication fact (first ten rows and first ten columns) on the Professor B Times Tables Chart.

OBJECTIVE #81 Children will correctly read numerals up to the hundreds of trillions.

OBJECTIVE #82 Children will be able to tell the value of each digit within any number up to the trillions.

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OBJECTIVE #83 Children will quickly and correctly do mixed written exercises involving addition and subtraction (sum less than or eual to 19).

OBJECTIVE #84 Children will correctly do short division, with and without remaider, using the multiplication facts.

OBJECTIVE #85 Children will correctly do additions, with and without regrouping, involving up to two three-place numbers.

OBJECTIVE #86 Children will correctly do subtractions, with and without regrouping, involving up to two three-place numbers.

OBJECTIVE #87 Students will correctly do multiplication involving up to three-place numbers by two-place numbers.

OBJECTIVE #88 Students will correctly add and subtract proper fractions involving unlike denominators.

OBJECTIVE #89 Students will correctly transform improper fractions to mixed numbers.

OBJECTIVE #90 Students will correctly transform mixed numbers to improper fractions.

OBJECTIVE #91 Students will correctly add mixed numbers.

OBJECTIVE #92 Students will correctly subtract mixed numbers.

OBJECTIVE #93 Students will correctly do long division examples involving up to two-place divisors and four place dividends.

PROFESSOR B SEQUENCE OF MATH OBJECTIVES
FIFTH GRADE

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OBJECTIVE #1 Children will say the complement in ten of any number chosen from one through nine.

OBJECTIVE #2 Children will instantly say the complement in ten of any number chosen from one through nine.

OBJECTIVE #3 Children will respond instantly and correctly when asked questions such as: "Ten-two," "Ten-seven," "Ten-four," "Ten-five," and so on.

OBJECTIVE #4 Children will respond instantly and correctly when the teacher taps such subtraction facts on chart #2 as "10-7," "10-5," "10-1," and so on.

OBJECTIVE #5 Children will say the complement in nine of any number chosen from one through eight.

OBJECTIVE #6 Children will instantly say the complement in nine of any number chosen from one through eight.

OBJECTIVE #7 Children will answer correctly when asked questions such as: "Nine-three," "Nine-five," "Nine-four," "Nine-eight," and so on.

OBJECTIVE #8 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-4," "9-2," "9-6," and so on.

OBJECTIVE #9 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-seven," "Ten-two," "Nine-five," and so on.

OBJECTIVE #10 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-8," "9-2," "10-5," "9-3," and so on.

OBJECTIVE #11 Children will say the complement in eight of any number chosen from one through seven.

OBJECTIVE #12 Children will instantly say the complement in eight of any number chosen from one through seven.

OBJECTIVE #13 Children will answer correctly when asked questions such as: "Eight-three," "Eight-five," "Eight-two," and so on.

OBJECTIVE #14 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "8-4," "8-2," "8-5," and so on.

OBJECTIVE #15 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-five," "Eight-seven," "Ten-nine," "Nine-two," "Eight-six," and so on.

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OBJECTIVE #16 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-6," "9-4," "8-1," "9-7," "8-4," "10-3," and so on.

OBJECTIVE #17 Children will say the complement in seven of any number chosen from one through six.

OBJECTIVE #18 Children will instantly say the complement in seven of any number chosen from one through six.

OBJECTIVE #19 Children will answer correctly when asked questions such as: "Seven-three," "Seven-six," "Seven-one," and so on.

OBJECTIVE #20 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "7-5," "7-3," "7-1," and so on.

OBJECTIVE #21 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-four," "Nine-eight," "Eight-five," "Seven-two," "Ten-seven," "Nine-three," "Eight-four," "Seven-two," "Eight-five," "Seven-two," "Ten-five," "Nine-eight," and so on.

OBJECTIVE #22 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-9," "7-4," "9-6," "8-2," "7-1," "10-5," "8-7," "9-5," and so on.

OBJECTIVE #23 Children will say the complement in six of any number chosen from one through five.

OBJECTIVE #24 Children will instantly say the complement in six of any number chosen from one through five.

OBJECTIVE #25 Children will answer correctly when asked questions such as: "Six-four," "Six-one," "Six-three," and so on.

OBJECTIVE #26 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "6-4," "6-1," "6-3," and so on.

OBJECTIVE #27 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Ten-seven," "Nine-five," "Eight-two," "Seven-four," "Six-three," "Eight-seven," "Ten-three," "Seven-two," "Nine-six," "Six-four," and so on.

OBJECTIVE #28 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-5," "10-9," "7-3," "6-2," "8-1," "6-5," "10-4," "8-4," "7-6," "9-3," and so on.

OBJECTIVE #29 Children will say the complement in five of any number chosen from one to four.

OBJECTIVE #30 Children will instantly say the complement in five of any number chosen from one through four.

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OBJECTIVE #31 Children will answer correctly when asked questions such as: "Five-two," "Five-four," "Five-one," and so on.

OBJECTIVE #32 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "5-3," "5-4," "5-2," and so on.

OBJECTIVE #33 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Six-five," "Ten-seven," "Five-two," "Seven-four," "Seven-two," "Nine-four," "Eigth-five," and so on.

OBJECTIVE #34 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "10-2," "8-3," "9-7," "5-2," "7-4," "6-2," and so on.

OBJECTIVE #35 Children will say the complement in four of any number chosen from one through three.

OBJECTIVE #36 Children will instantly say the complement in four of any number chosen from one through three.

OBJECTIVE #37 Children will answer correctly when asked questions such as: "Four-one," "Four-three" and "Four-two."

OBJECTIVE #38 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "4-3," "4-2," and "4-1."

OBJECTIVE #39 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Six-five," "Nine-six," "Seven-four," "Ten-eight," "Five-three," "Eight-five," "Four-two," and so on.

OBJECTIVE #40 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "9-8," "10-3," "6-4," "7-5," "8-4," "5-3," "4-2," and so on.

OBJECTIVE #41 Children will instantly say the complement in three of one or two and the complement in two of one.

OBJECTIVE #42 Children will respond instantly and correctly when the teacher taps such subtraction facts on Chart #2 as "3-1," "3-2," "2-1."

OBJECTIVE #43 Children will instantly and correctly answer when asked questions in rapid sequences such as: "Five-four," "Nine-two," "Two-one," "Ten-five," "Four-three," "Eight-six," "Three-one," "Seven-four," "Six-two," and so on.

OBJECTIVE #44 Children will respond instantly and accurately when the teacher taps any subtraction fact on Chart #2.

OBJECTIVE #45 Children will respond immediately and correctly (without use of fingers) to questions on the lower subtraction facts.

OBJECTIVE #46 Given two addends, children will correctly identify which chart contains them.

OBJECTIVE #47 Given two addends, children will immediately and correctly identify (without use of fingers) the chart which contains them.

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OBJECTIVE #48 Children will respond immediately and accurately (without use of fingers) to questions on the lower addition facts.

OBJECTIVE #49 Children will quickly and correctly do mixed written exercises involving addition and subtraction (sum less than or equal to 10).

OBJECTIVE #50 Children will count from 1 to 10 while tapping the associated numerals on CHART #4.

OBJECTIVE #51 Children will count from 1 to 20 while tapping numerals appropriately on Chart #4.

OBJECTIVE #52 Children will be able to count from 1 to 100 while tapping numerals appropriately on CHART #4.

OBJECTIVE #53 Children will be able to count from 1 to 100 while only looking at CHART #4.

OBJECTIVE #54 Children will be able to count from 1 to 100 without looking at CHART #4.

OBJECTIVE #55 Children will respond instantly and correctly to the 10+1 through 10+9 addition facts.

OBJECTIVE #56 Children will transform the "nine-plus," "eight-plus," "seven-plus" and "six-plus" addition facts into equivalent "ten-plus" facts and find the answers without counting.

OBJECTIVE #57 Children will respond immediately and accurately (without use of fingers) to questions on the higher addition facts by means of a cognitive process.

OBJECTIVE #58 Children will respond immediately and accurately to the "ten minus" facts as they are indicated by the pointer on CHART #7.

OBJECTIVE #59 Children will respond immediately and accurately when the teacher points to examples on CHART #7. For example, when the teacher points appropriately to 12-7, children will respond, "Three plus two."

OBJECTIVE #60 Children will give answers to the higher subtraction facts by means of a cognitive process, without the use of fingers.

OBJECTIVE #61 Children will quicken their cognitive responses to questions on the higher subtraction facts.

OBJECTIVE #62 Children will respond immediately and accurately to questions on the higher subtraction facts by means of a cognitive process.

OBJECTIVE #63 Children will be able to

1. respond instantly and correctly when asked any of the "two times" multiplication facts;
2. recite the multiples of 2 forward to 20 and backward to zero; and
3. respond instantly and correctly when asked any of the associated division facts.

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OBJECTIVE #64 Children will respond instantly and correctly when the teacher taps any "one times" or "two-times" multiplication fact (first two rows and first two columns) on the Professor B Times Tables Chart.

OBJECTIVE #65 Children will be able to

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3. respond instantly and correctly when asked any of the associated division facts.

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OBJECTIVE #69 Children will be able to

1. respond instantly and correctly when asked any of the "five times" multiplication facts;
2. recite the multiples of 5 forward to 50 and backward to zero; and
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OBJECTIVE #70 Children will respond instantly and correctly when the teacher taps any "one times," through "five times" multiplication fact (first five rows and first five columns) on the Professor B Times Tables Chart.

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OBJECTIVE #74 Children will respond instantly and correctly when the teacher taps any "one times," through "seven times" multiplication fact (first seven rows and first seven columns) on the Professor B Times Tables Chart.

OBJECTIVE #75 Children will be able to
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OBJECTIVE #77 Children will be able to
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2. recite the multiples of 9 forward to 90 and backward to zero; and
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OBJECTIVE #78 Children will respond instantly and correctly when the teacher taps any "one times," through "nine times" multiplication fact (first nine rows and first nine columns) on the Professor B Times Tables Chart.

OBJECTIVE #79 Children will be able to
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2. recite the multiples of 10 forward to 100 and backward to zero; and
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OBJECTIVE #80 Children will respond instantly and correctly when the teacher taps any "one times," through "ten times" multiplication fact (first ten rows and first ten columns) on the Professor B Times Tables Chart.

OBJECTIVE #81 Children will correctly read numerals up to the hundreds of trillions.

OBJECTIVE #82 Children will be able to tell the value of each digit within any number up to the trillions.

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OBJECTIVE #86 Children will correctly do subtractions, with and without regrouping, involving up to two three-place numbers.

OBJECTIVE #87 Students will correctly do multiplication involving up to three-place numbers by two-place numbers.

OBJECTIVE #88 Students will correctly add and subtract proper fractions involving unlike denominators.

OBJECTIVE #89 Students will correctly transform improper fractions to mixed numbers.

OBJECTIVE #90 Students will correctly transform mixed numbers to improper fractions.

OBJECTIVE #91 Students will correctly add mixed numbers.

OBJECTIVE #92 Students will correctly subtract mixed numbers.

OBJECTIVE #93 Students will correctly do long division examples involving up to two-place divisors and four place dividends.

OBJECTIVE #94 Students will correctly multiply one proper fraction by another.

OBJECTIVE #95 Students will correctly multiply one mixed number by another.

OBJECTIVE #96 Students will correctly divide one proper fraction by another.

OBJECTIVE #97 Students will correctly divide one mixed number by another.

OBJECTIVE #98 Students will correctly do mixed exercises involving addition, subtraction, multiplication and division of proper fractions and mixed numbers.

OBJECTIVE #99 Students will develop "trigger responses" such that, for example, "four decimal places," trigger "ten-thousandths" or "hundredths" trigger "two decimal places."

OBJECTIVE #100 Students will instantly and correctly name the place value on either side of the decimal point when the teacher points to a digit in any number.

OBJECTIVE #101 Students will correctly write the expansion for any number written as a decimal expression.
For example, 234.56 = 200 +30+4+.5+.06

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OBJECTIVE #102 Students will correctly write the decimal expression when they hear such verbal statements as "two thousand, five hundred, seventy-nine hundredths."

OBJECTIVE #103 Students will correctly read or write a given decimal expression, with value less than one, as a proper fraction.

OBJECTIVE #104 Students will correctly read or write a given decimal expression, with value greater than one, as an improper fraction or a mixed number.

OBJECTIVE #105 Students will correctly add one number, expressed as a decimal, to another.

OBJECTIVE #106 Students will correctly subtract one number, expressed as a decimal, from another.

OBJECTIVE #107 Students will correctly multiply one number, expressed as a decimal, by another.

OBJECTIVE #108 Students will consistently determine which of two decimal expressions represents the larger number.

OBJECTIVE #109 Students will correctly transform any fraction to an equivalent decimal.

OBJECTIVE #110 Students will be able to consistently "tell the truth" as they explain the steps when transforming a fraction to an equivalent decimal by means of division. . . .

OBJECTIVE #111 Students will correctly divide one number, expressed as a decimal, by another.

OBJECTIVE #112 Students will be able to consistently "tell the truth" as they explain the steps when dividing one number, expressed as a decimal, by another.

OBJECTIVE #113 Students will correctly round off any number to an appropriate place.

SUPERVISING AND MONITORING FOR A SUCCESSFUL PROFESSOR B IMPLEMENTATION

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In order to ensure a successful Professor B implementation in your school system, it is necessary to institute adequate procedures for supervising and monitoring classroom applications of the stategies and techniques.

This task may be performed by the district mathematics director, a principal, assistant principal, staff developer or mathematics specialist. He/she must visit a number of assigned classrooms once every two or three weeks. Every classroom involved should receive from twelve to eighteen such visits throughout the school year. It is helpful to provide teachers a schedule of your visits through the year.

Each visit should begin with a brief "entry conference" followed by your observation of the teacher's Professor B lesson and your own demonstration lesson. The visit should conclude with an "exit conference."

Each lesson in the Professor B teacher's guides for the math slides and math charts concludes with the statement: When they have practiced sufficiently to master Objective ____, move on to the next activity. Clearly, then, **mastery** of each objective **by the whole** class is a priority. Each lesson also makes pointed reference to the minimum quantity of drill time necessary to ensure retention of all previously mastered objectives. The guides address not merely mastery, but its maintenance as well; **mastery once attained must be sustained.**

Accordingly, each teacher will receive a Professor B Sequence of Math Objectives and a Professor B Mastery Learning Check Sheet. Numbers in the boxes on the check sheet refer to the numbered sequence of the objectives. When the teacher has assessed that his/her class has mastered an objective, he/she must place a check mark in the space above the diagonal within the corresponding box on the check sheet. The principal or his/her designee will keep a set of up-to-date check sheets (up-dated every week) which must be made available for inspection by anyone who is assigned the role of supervisor/monitor of the implementation.

The supervisor/monitor should note the latest of the objectives mastered by a teacher's class before making a visit. As part of his/her own demonstration lesson, he/she must make an assessment as to whether **past objectives**, once attained, have, in fact, been sustained. This is done by assessing two or three objectives which, as the teacher's check sheet indicates, were mastered months earlier. If you assess that students have mastered these objectives, you are to place your check mark and signature below the teacher's. If there is no mastery, place an "x" and your signature within the appropriate spaces.

The entry conference

The purpose of the entry conference is to determine the content of the teacher's, as well as your own, demonstration. He/she may have had difficulty in executing some strategy or technique and may request that you watch them try it first, and that you demonstrate it after. On the other hand, you might be asked to demonstrate something which the teacher plans to do in the near future.

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Observing the teacher's demonstration

When observing a teacher's demonstration, look for the following:

1. Is the teacher making effective eye contact with **all** members of the class?
2. Are **all** the children focusing their attention on the teacher's activity?
3. Are **all** the children responding as the teacher requests?
4. When a unison response by the class is requested is there, in fact, a unison response from the class?
5. Does the teacher generate a **strong, confident unison response** before requesting responses from individuals?
6. Is the teacher making students respond as quickly as their responses permit (not so quickly as to overwhelm them, nor so slowly as to bore them)?
7. Does the teacher **most often challenge the slowest members of the class to respond individually?**
8. Does the teacher request four or five responses from each individual?
9. Does the teacher allow any student to give a response for another without the teacher's permission?
10. Does the teacher vary between unison and individual responses sufficiently often?
11. Does the teacher conduct the activities in a "gamey" manner?
12. Does the teacher cut the unison activity at the peak of excitement?

Your own demonstration

It is wise to demonstrate the same strategies and techniques in your lesson as you request they show in their's. You must carefully observe the twelve points in the previous section.

Professor B will train you throughout 1990-1991 to fulfill this important function.

The exit conference

At each exit conference, you should request that the teacher indicate, approximately, which objective he/she will be working on during your next visit. It is understandable that occasionally a teacher's estimate concerning his/her objective two weeks in the future may be off target.

Along with your suggestions to the teacher regarding those areas in which he/she could improve, offer some positive comments concerning the lesson he/she conducted. It will often be possible to congratulate teachers for their excellent preparation of the students since, without that, your own lesson could not have succeeded.

In anticipation that a class may have lost mastery of an objective it had once achieved, it is necessary to maintain the once per two weeks schedule of visits. The sooner you discern loss of mastery, the easier it is to correct it. When this occurs, you should suggest corrective measures during your exit conference and reassess children's mastery of that objective at a future date.

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Observing the teacher's demonstration

When observing a teacher's demonstration, look for the following:

1. Is the teacher making effective eye contact with **all** members of the class?
2. Are **all** the children focusing their attention on the teacher's activity?
3. Are **all** the children responding as the teacher requests?
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7. Does the teacher **most often challenge the slowest members of the class to respond individually?**
8. Does the teacher request four or five responses from each individual?
9. Does the teacher allow any student to give a response for another without the teacher's permission?
10. Does the teacher vary between unison and individual responses sufficiently often?
11. Does the teacher conduct the activities in a "gamey" manner?
12. Does the teacher cut the unison activity at the peak of excitement?
13. Does the teacher <u>often</u> require that children perform recitation and articulation exercises in front of their classmates?
14. Does the teacher <u>often</u> reward faster learners by having them elicit unison and individual responses from the class?

Your own demonstration

It is wise to demonstrate the same strategies and techniques in your lesson as you request they show in their's. You must carefully observe the twelve points in the previous section.

Professor B will train you throughout 1990-1991 to fulfill this important function.

The exit conference

At each exit conference, you should request that the teacher indicate, approximately, which objective he/she will be working on during your next visit. It is understandable that occasionally a teacher's estimate concerning his/her objective two weeks in the future may be off target.

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In anticipation that a class may have lost mastery of an objective it had once achieved, it is necessary to maintain the once per two weeks schedule of visits. The sooner you discern loss of mastery, the easier it is to correct it. When this occurs, you should suggest corrective measures during your exit conference and reassess children's mastery of that objective at a future date.

THE PROFESSOR B TIME-LINE
THROUGH THE
ADDITION, SUBTRACTION, MULTIPLICATION FACTS

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ACTIVITIES	TIME
1. The ten-chart game with all the numbers, some numbers, no numbers (approximately 15 minutes).	2-3 days
2. "Ten-three," "Ten-five," "Ten-eight," and so on (auditory stimulus, auditory response) for about 6 minutes. Also point rapidly to "10-7," "10-4," "10-6," and so on (visual stimulus, auditory response - use Chart #2) for about 6 minutes.	2 days
CHECK-POINT 1: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the "ten-minus" facts have been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps these facts on Chart #2.	
3. The nine-chart game with all the numbers, some numbers, no numbers (approximately 15 minutes). Review #2 (both ways) for a total of 8 minutes.	2-3 days
4. "Nine-two," "Nine-four," "Nine-six,"and so on (auditory stimulus auditory response) for about 6 minutes. Also point rapidly to "9-5," "9-7," "9-1," and so on (visual stimulus, auditory response - use chart #2) for about 6 minutes. Review #2 (both ways) for a total of 8 minutes.	2 days
5. Mixed practice: "Ten-one," "Nine-eight," "Ten-six," "Nine-five," "Ten-three," "Nine-two," and so on (auditory stimulus, auditory response) for about 4 minutes. Also point rapidly to "10-6," "9-7," "10-2," "9-3," and so on (visual stimulus, auditory response - use Chart #2) for about 4 minutes.	2 days
CHECK-POINT 2: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the "ten-minus" and "nine-minus" facts have been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps these facts on Chart #2.	
6. The eight-chart game with all the numbers, some numbers, no numbers (approximately 15 minutes). Review #5 (both ways) for a total of 8 minutes.	2-3 days
7. "Eight-four," "Eight-two," "Eight-seven," and so on (auditory stimulus, auditory response) for about 6 minutes. Also point rapidly to "8-3," "8-7," "8-5," and so on (visual stimulus, auditory response - use Chart #2) for about 6 minutes. Review #5 (both ways) for a total of 8 minutes.	2 days

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ACTIVITIES	TIME
8. Mixed practice: "Ten-four," "Nine-five," "Eight-seven," "Ten-nine," "Nine-two," "Eight-six," and so on (auditory stimulus, auditory response) for about 4 minutes. Also point rapidly to "10-7," "9-5," "8-3," and so on (visual stimulus, auditory response - use Chart #2) for about 4 minutes.	
CHECK-POINT 3: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the "ten-minus," "nine-minus" and "eight-minus" facts have been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps these facts on Chart #2.	
9. The seven-chart game with all the numbers, some numbers, no numbers (approximately 10 minutes). Review #8 (both ways) for a total of 8 minutes.	2-3 days
10. "Seven-one," "Seven-four," "Seven-two," and so on (auditory/auditory) for about 4 minutes. Also point rapidly to "7-5," "7-2," "7-4," and so on (visual/auditory - use Chart #2) for about 4 minutes. Review #8 for a total of 8 minutes.	2 days
11. Mixed practice: "Ten-five," "Nine-two," "Eight-six," "Seven-three," (auditory/auditory) for about 4 minutes. Also point rapidly to "10-6," "9-4," "8-7," "7-5," and so on (visual/auditory - use Chart #2) for about 4 minutes.	2 days
CHECK-POINT 4: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the "ten-minus" through "seven-minus" facts have been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps these facts on Chart #2.	
12. The six-chart game with all the numbers, some numbers, no numbers (approximately 10 minutes). Review #11 (both ways) for a total of 8 minutes.	2-3 days
13. "Six-five," "Six-three," "Six-two," and so on (auditory/auditory) for about 4 minutes. Also point rapidly to "6-4," "6-1," "6-3," and so on (visual/auditory - use chart #2) for about 4 minutes. Review #11 (both ways) for a total of 8 minutes.	2 days
14. Mixed practice: "Ten-nine," "Nine-one," "Eight-six," "Seven-two," "Six-three," (auditory/auditory) for about 4 minutes. Also point rapidly to "10-4," "9-8," "8-5," "7-6," "6-2," and so on (visual/auditory - use Chart # 2) for about 4 minutes.	2 days

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ACTIVITIES	TIME
CHECK-POINT 5: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the "ten-minus" through "six-minus" facts have been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps these facts on Chart #2.	
15. The five-chart game with all the numbers, some numbers, no numbers (approximately 5 minutes). Review #14 (both ways) for a total of 8 minutes.	2 days
16. "Five-two," "Five-four," and so on (auditory/auditory) for about 3 minutes. Also point rapidly to "5-4," "5-2," and so on (visual/auditory - use Chart #2) for about 3 minutes. Review #14 (both ways) for a total of 8 minutes.	2 days
17. Mixed practice: "Ten-four," "Nine-seven," "Eight-one," "Seven-three," "Six-two," "Five-three," and so on (auditory/auditory) for about 4 minutes. Also point rapidly to "10-6," "9-1," "8-6," "7-4," "6-5," "5-1," and so on (visual/auditory - use Chart #2) for about 4 minutes.	2 days
CHECK-POINT 6: MASTERY ONCE ATTAINED MUST BE SUSTAINED Now that mastery of the "ten-minus" through "five-minus" facts have been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps these facts on Chart #2.	
18. The four-chart game with all the numbers, some numbers, no numbers (approximately 5 minutes). Review #17 (both ways) for a total of 8 minutes.	2 days
19. "Four-three," "Four-one," "Four-two," and so on (auditory/auditory) for about 3 minutes. Also point rapidly to "4-1," "4-3," "4-2," and so on (visual/auditory - use Chart #2) for about 3 minutes. Review #17 (both ways) for a total of 8 minutes.	2 days
20. Mixed practice: "Ten-nine," "Nine-one," "Eight-six," "Seven-two," "Six-three," "Five-two," "Four-one," and so on (auditory/auditory) for about 4 minutes. Also point rapidly to "10-1," "9-6," "8-4," "7-6," "6-2," "5-3," "4-2," and so on (visual/auditory - use Chart #2) for about 4 minutes.	2 days
CHECK-POINT 7: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the "ten-minus" through "four-minus" facts have been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps these facts on Chart #2.	

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ACTIVITIES	TIME
21. The three-and two-chart games with all the numbers, some numbers, no numbers (approximately 5 minutes). Review #20 (both ways) for a total of 8 minutes.	2 days
22. "Three-one," "Two-one," "Three-two," and so on (auditory/auditory) for about 2 minutes. Also point rapidly to "3-1," "2-1," "3-2," and so on (visual/auditory - use Chart #2) for about 2 minutes. Review #20 (both ways) for about 5 minutes.	2 days
23. Mixed practice: "Ten-six," "Nine-three," "Eight-four," "Seven-one," "Six-four," "Five-three," "Four-two," "Three-one," "Two-one," and so on (auditory/auditory) for about 3 minutes. Also point rapidly to "10-4," "9-7," "8-6," "7-2," "6-5," "5-2," "4-1," "3-2" "2-1," and so on (visual/auditory - use Chart #2) for about 3 minutes.	2 days
CHECK-POINT 8: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of Chart #2 has been attained, it will be sustained for the rest of the school year by means of a 3-minute (combination of auditory/auditory and visual/auditory) drill **EVERY DAY.**	
24. Introduction of Chart #3. "Which chart has 'seven and three'?" "Which chart has 'four and two'?" "Which chart has 'six and one'?" Ask many such questions in reference to Chart #3 for about 10 minutes. Check-point 8 - 3 minutes.	2 days
25. Chart #3 - Tap "4+3" on the chart and ask, "Four plus three ____?" Similarly tap and ask for many different examples on the chart. Do this for about 6 minutes. Now quickly tap (do not ask) many different examples on the chart while students respond as rapidly as they can. Do this for about 6 minutes. Check-point 8 - 3 minutes.	3 days
CHECK-POINT 9: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of Chart #3 has been attained, it will be sustained for the rest of the school year by means of a 3-minute (combination of auditory/auditory and visual/auditory) drill **EVERY DAY.**	
26. Chart #4 - Tap-counting exercises from one through 20. Every child performs. Do this for about 15 minutes. Check-point 8 - 3 minutes. Check-point 9 - 3 minutes.	2 days
27. Chart #4 - Tap-counting exercises beyond 20 up to 100. Every child performs. Do this for about 15 minutes. Check-point 8 - 3 minutes. Check-point 9 - 3 minutes.	3 days

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ACTIVITES	TIME
28. Chart #4 - "Look and count" exercises (no tapping) from one up to 100. Every child performs. Do this for about 15 minutes. Check-point 8 - 3 minutes. Check-point 9 - 3 minutes.	2 days
29. "Think and count" exercises from one up to 100 (do not use Chart #4 - no tapping, no looking). Every child performs. Do this for about 15 minutes.	2 days
CHECK-POINT 10: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of counting (one to one hundred) has been attained, it will be sustained for the rest of the school year by having 1. the whole class perform a **daily** think and count exercise in unison (count from 27 to 53, for example); and 2. each of the slowest learners performing such an exercise **daily.**	
30. Chart #5 - "Nine plus ___snatch!" "So nine plus ___?" "Eight plus ___snatch!" "So eight plus ___?" After some practice with "nine plus" and "eight plus" separately, begin to jump back and forth from one to the other. Do all this for about 15 minutes. Check-point 8 - 3 minutes. Check-point 9 - 3 minutes. Check-point 10 - 3 minutes.	1 day
31. Chart #5 - "Nine plus ___snatch!" "So nine plus ___?" "Eight plus ___snatch!" "So eight plus ___?" "Seven plus ___snatch!" "So seven plus ___?" "Six plus ___snatch!" "So six plus ___?" After some practice with nine plus, eight plus, seven plus and six plus separately, begin to jump back and forth arbitrarily among them. Do all this for about 15 minutes. Check-point 8 - 3 minutes. Check-point 9 - 3 minutes. Check-point 10 - 3 minutes.	3 days
32. Chart #6 - The larger number snatches. Point to 8+6, for example, on Chart #6. Say, "Snatch!" "So eight plus six ___?" Point to 6+7, for example, on Chart #6. Say, "Snatch!" "So six plus seven ___? Continue practicing similarly with Chart #6 for about 15 minutes. Check-point 8 - 3 minutes. Check-point 9 - 3 minutes. Check-point 10 - 3 minutes.	3 days

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ACTIVITIES	TIME
33. Chart #6 - At this point, rapidly tap examples on Chart #6 and have the students respond as quickly as they can. Do this for about 15 minutes. Check-point 8 - 2 minutes. Check-point 9 - 2 minutes. Check-point 10 - 3 minutes.	3 days
CHECK-POINT 11: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of chart #6 has been attained, it will be sustained for the rest of the school year by means of a 3-minute (combination of auditory/auditory and visual/auditory) drill **EVERY DAY.**	
34. Chart #7 - Do the "ten-minus" part of the subtraction facts on this chart. Move as rapidly as student's responses will allow. Do this for about 10 minutes. Check-point 8 - 2 minutes. Check-point 9 - 2 minutes. Check-point 10 - 2 minutes. Check-point 11 - 3 minutes.	2 days
35. Chart #7 - Have students respond to each subtraction fact on this chart with the appropriate sum followed by the answer. For example, the response for "13-8" is "two plus three, five." Move as rapidly as student's responses will allow. Do this for 10 minutes. Check-point 8 - 2 minutes. Check-point 9 - 2 minutes. Check-point 10 - 2 minutes. Check-point 11 - 3 minutes.	3 days
36. Chart #7 - Rapidly tap the examples on this chart and have the students respond with the answers as quickly as they can. Do this for about 10 minutes. Check-point 8 - 2 minutes. Check-point 9 - 2 minutes. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes.	3 days
CHECK-POINT 12: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of Chart #7 has been attained, it will be sustained for the rest of the school year by means of a 3-minute (combination of auditory/auditory and visual/auditory) drill **EVERY DAY.**	
37. Teach the "two times" multiplication facts by means of the Professor B techniques. Ask the required questions of the class and its individuals. This is a whole-period lesson. Check-point 8 - 2 minutes. Check-point 9 - 2 minutes. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes.	2-3 days

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ACTIVITIES	TIME
38. Use the Professor B Times Tables Chart. Rapidly tap examples in the first two columns and first two rows while students respond as quickly as they can. Do this for 8 minutes. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 3 minutes.	4 days
CHECK-POINT 13: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the two-times table has been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps examples in the first two columns and the first two rows.	
39. Teach the "three-times" multiplication facts by means of the Professor B techniques. Ask the required questions of the class and its individuals. This is a whole-period lesson. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes. Check-point 13 - 2 minutes.	2-3 days
40. Use the Professor B Times Tables Chart. Rapidly tap examples in the first three columns and first three rows while students respond as quickly as they can. Do this for 8 minutes. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes.	4 days
CHECK-POINT 14: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the three-times table has been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps examples in the first three columns and the first three rows.	
41. Teach the "four-times" multiplication facts by means of the Professor B techniques. Ask the required questions of the class and its individuals. This is a whole-period lesson. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes. Check-point 14 - 3 minutes.	2-3 days

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ACTIVITES	TIME
42. Use the Professor B Times Tables Chart. Rapidly tap examples in the first four columns and first four rows while students respond as quickly as they can. Do this for 8 minutes. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes.	4 days
CHECK-POINT 15: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the four-times table has been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps examples in the first four columns and the first four rows.	
43. Teach the "five-times" multiplication facts by means of the Professor B techniques. Ask the required questions of the class and its individuals. This is a whole-period lesson. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes. Check-point 15 - 3 minutes.	2-3 days
44. Use the Professor B Times Tables Chart. Rapidly tap examples in the first five columns and first five rows while students respond as quickly as they can. Do this for 8 minutes. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes.	4 days
CHECK-POINT 16: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the five-times table has been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps examples in the first five columns and the first five rows.	
45. Teach the "six-times" multiplication facts by means of the Professor B techniques. Ask the required questions of the class and its individuals. This is a whole-period lesson. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes. Check-point 16 - 3 minutes.	2-3 days

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ACTIVITIE	TIME
46. Use the Professor B Times Tables Chart. Rapidly tap examples in the first six columns and first six rows while students respond as quickly as they can. Do this for 8 minutes. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes.	4 days
CHECK-POINT 17: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the six-times table has been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps examples in the first six columns and the first six rows.	
47. Teach the "seven-times" multiplication facts by means of the Professor B techniques. Ask the required questions of the class and its individuals. This is a whole-period lesson. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes. Check-point 17 - 3 minutes.	2-3 days
48. Use the Professor B Times Tables Chart. Rapidly tap examples in the first seven columns and first seven rows while students respond as quickly as they can. Do this for 10 minutes. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes.	4 days
CHECK-POINT 18: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the seven times table has been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps examples in the first seven columns and the first seven rows.	
49. Teach the "eight-times" multiplication facts by means of the Professor B techniques. Ask the required questions of the class and its individuals. This is a whole-period lesson. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes. Check-point 18 - 3 minutes.	2-3 days

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ACTIVITIES	TIME
50. Use the Professor B Times Tables Chart. Rapidly tap examples in the first eight columns and first eight rows while students respond as quickly as they can. Do this for 10 minutes. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes.	4 days
CHECK-POINT 19: MASTERY ONCE ATTAINED MUST BE SUSTAINED. Now that mastery of the eight-times table has been attained, it will be sustained for the rest of the school year if the class is responding **daily** as the teacher rapidly taps examples in the first eight columns and the first eight rows.	
51. Teach the "nine-times" and "ten-times" multiplication facts by means of the Professor B techniques. Ask the required questions of the class and its individuals. This is a whole-period lesson. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes. Check-point 19 - 3 minutes.	2-3 days
52. Use the Professor B Times Tables Chart. Rapidly tap examples in the first ten columns and first ten rows while students respond as quickly as they can. Do this for 10 minutes. Check-point 8 - 1 minute. Check-point 9 - 1 minute. Check-point 10 - 2 minutes. Check-point 11 - 2 minutes. Check-point 12 - 2 minutes.	4 days

PROFESSOR B MASTERY LEARNING
CHECK SHEET

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School: _____ Grade: _____

Teacher: _____

Numbered boxes below refer to the numbered sequence of Professor B objectives for this grade.

1	2	3	4 Check-point 1 Chart #2	5	6	7	8	9	10 Check-point 2 Chart #2
11	12	13	14	15	16 Check-point 3 Chart #2	17	18	19	20
21	22 Check-point 4 Chart #2	23	24	25	26	27	28 Check-point 5 Chart #2	29	30
31	32	33	34 Check-point 6 Chart #2	35	36	37	38	39	40 Check-point 7 Chart #2
41	42	43	44 Check-point 8 Chart #2	45	46	47	48 Check-point 9 Chart #3	49	50
51	52	53	54 Check-point 10 Charts 1-100	55	56	57 Check-point 11 Chart #6	58	59	60
61	62 Check-point 12 Chart #7	63	64 Check-point 13 1-2x table	65	66 Check-point 14 1-3x table	67	68 Check-point 15 1-4x table	69	70 Check-point 16 1-5x table
71	72 Check-point 17 1-6x table	73	74 Check-point 18 1-7x table	75	76 Check-point 19 1-8x table	77	78 Check-point 20 1-9x table	79	80 Check-point 21 1-10x table
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120

PROFESSOR B MASTERY LEARNING
CHECK SHEET

School:_____ Grade:_____

Teacher:_____

Numbered boxes below refer to the numbered sequence of Professor B objectives for this grad

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120